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Twin-Safe: Advancing Road Safety Through Twinning

Deliverable 5.4

Materials for the summer school on Diversity, Equality, and Inclusion

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Project identification

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Contributions from	University of Zagreb, Faculty of Transport and Traffic Sciences: Dario Babić, Lucija Franković; Hasselt University: An Neven, Tom Brijs; Lund University: Vanessa Stjernborg, Lena Hiselius, Carl Jonsson, Carmelo D'agostino

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v1.0	July 8 2026	80 %	Initial deliverable structure	Vanessa Stjernborg, Lena Hiselius, Carl Jonsson, An Neven, Dario Babić
v1.1	July 9 2026	100 %	Review and finalisation of the deliverable	Dario Babić, Lucija Franković, Tom Brijs, Carmelo D'agostino

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Glossary and abbreviations

Word / Abbreviation	Description
FTTS	University of Zagreb, Faculty of Transport and Traffic Sciences
HU	Hasselt University
LU	Lund University
TWIN-SAFE	The project on the topic of Advancing Road Safety Through Twinning
CERTS	Centre of Excellence for Road Traffic Safety at FTTS
WP	Work package
SSA	Safe Systems Approach
IMOB	The Transportation Research Institute

1 Introduction

The TWIN-SAFE project aims to strengthen road safety research capacities at the University of Zagreb, Faculty of Transport and Traffic Sciences (FTTS), through collaboration with leading European institutions, including Lund University and Hasselt University. One of the project's objectives (O4) is to develop an inclusive, international, open, and gender-balanced research environment with strong research management capabilities at FTTS. As part of this objective, the project seeks to empower women and international students, promote their active participation in research and decision-making processes, and increase awareness of Diversity, Equality, and Inclusion (DEI) within the transport research community.

To address these goals, the INSIGHT (INclusive Safety and Inequality in Everyday Mobility) Summer School 2026 was organised as a capacity-building and knowledge-exchange activity. The summer school focused on the role of diversity, equality and inclusion in transport systems and road safety. It brought together researchers, doctoral students, and other professionals from different disciplines to explore how mobility systems affect different user groups and how transport planning can contribute to both safer and more inclusive mobility.

The objective of this deliverable is to document the educational content, activities, and learning outcomes of the INSIGHT Summer School 2026. The deliverable demonstrates how the summer school contributed to the achievement of TWIN-SAFE Objective O4 by fostering an inclusive research environment, strengthening international collaboration, and building competencies related to DEI in transport research and practice.

The summer school adopted an interdisciplinary approach that combined more theoretical lectures, interactive discussions, and practical field-based exercises. Participants examined transport equity, accessibility, subjective and objective dimensions of road safety, gender differences in mobility, and the experiences of persons with disabilities and other more vulnerable groups. A city walk exercise conducted in Zagreb provided opportunities to apply theoretical concepts to real-world urban environments and identify barriers to inclusive mobility.

This report presents the educational materials used during the summer school and summarises the main themes, activities, and observations. Together, these materials provide a foundation for understanding how diversity, equality, and inclusion can be integrated into transport research, planning, and policy-making to support safer and more inclusive mobility.

2 The Importance of Diversity, Equality and Inclusion in Transportation

Transportation plays a fundamental role in enabling participation in society by providing access to employment, education, healthcare, social networks, and essential services. As such, transport systems are not only technical infrastructures but also social systems that influence people's quality of life, well-being, and opportunities in everyday life.

While transport planning has traditionally focused on efficiency, travel speed, and capacity, there is growing recognition that mobility opportunities are not experienced equally by all members of society. Individuals differ in their characteristics, resources, capabilities, and travel needs, which means that transport systems may create unequal outcomes if these differences are not sufficiently considered. The concepts of diversity, equality/equity, and inclusion provide an important framework for understanding and addressing such disparities. Together, they emphasize the need for transport systems that offer fair access, recognise differing needs and circumstances, and enable all individuals to participate independently.

Mobility patterns and travel experiences vary across different population groups. Factors such as gender, age, disability, socioeconomic conditions, and life circumstances influence how people travel, the barriers they encounter, and the risks they face. However, transport systems have often been designed around the needs of an assumed "average" user, potentially overlooking the diversity of travel behaviours and mobility requirements that exist within the population. Recognising and addressing these differences is therefore essential for creating more inclusive and accessible transport systems.

The INSIGHT (INclusive Safety and Inequality in Everyday Mobility) Summer School 2026 was developed to explore how diversity, equality and inclusion (DEI) influence transport systems, everyday mobility, and traffic safety outcomes. While traditional transport research and planning have largely focused on efficiency, infrastructure performance, and aggregate safety indicators, there is growing recognition that mobility systems do not affect all people equally. Differences in gender, age, socioeconomic status, disability, ethnicity, life circumstances, and access to resources shape how people experience mobility, safety, accessibility, and participation in society.

The summer school brought together researchers, doctoral students, and others from multiple disciplines to examine the intersections between transport equity, social inclusion, accessibility, lived experiences, and road safety. Through a combination of lectures, discussions, and field-based observations, participants were encouraged to critically reflect on who benefits from current transport systems, who faces barriers, and how mobility systems can be redesigned to better support safety, participation, and equity for all users.

A key premise of the INSIGHT Summer School was that transportation systems are not neutral. Infrastructure design, planning priorities, data collection practices, and policy decisions may unintentionally reinforce existing inequalities. As a result, some groups experience greater safety risks, poorer accessibility, additional travel burdens, or reduced opportunities to participate in everyday activities. Understanding these disparities is necessary for achieving both sustainable mobility and equitable transport outcomes.

The INSIGHT Summer School also highlighted the importance of considering both objective and subjective dimensions of safety. While objective safety relates to measurable outcomes such as crashes and injuries, subjective safety reflects how safe people feel when using transport systems. Both dimensions influence mobility choices and participation in everyday activities. Understanding

these experiences is therefore crucial for identifying inequalities in mobility and developing transport environments that are both safe and inclusive.

The INSIGHT Summer School demonstrated that road safety and transport equity are closely interconnected objectives. By placing human experiences, diversity, and social inclusion at the centre of transport research and planning, mobility systems can better support participation, independence, well-being, and quality of life - for all.

The summer school was structured around four complementary themes. First, participants examined transport equity and social justice perspectives in mobility systems. Second, they explored both objective and perceived dimensions of traffic safety and their implications for travel behaviour. Third, attention was given to differences between user groups, including the influence of gender norms and social expectations on mobility patterns. Finally, participants investigated accessibility, hidden mobility barriers, and the lived experiences of people with disabilities whose needs are often insufficiently reflected in transport planning.

To connect theory with practice, participants conducted a city walk exercise in Zagreb, applying equity lens to real urban environments. By observing mobility chains, safety conditions, accessibility barriers, and potential differences between user groups, participants identified critical moments where transport systems may become exclusionary, unsafe, or difficult to navigate. These observations allowed participants to translate theoretical concepts into practical recommendations for creating safer, fairer, and more inclusive mobility environments.

This deliverable presents the educational materials used during the INSIGHT Summer School 2026.

3 Workshop agenda

Date:

June 16 - 18, 2026

Location:

University of Zagreb Faculty of Transport and Traffic Sciences

Kuslanova 2, Zagreb, Croatia

Program

Day 1 – Inclusive Traffic Safety & Mobility: The Intersection of Traffic Safety and Transport Equity – June 16th 2026

Time	*Activity*
09:00 – 10:30	Introduction and get to know each other + discussion (Dario Babić – FTTS)
10:30 – 11:00	Coffee break
11:00 – 12:00	Behind the numbers: The Intersection of Transport Equity & Traffic Safety (Vanessa Stjernborg – Lund University)
12:00 – 13:00	Lunch
13:00 – 14:30	Actual and perceived road safety, an overview of the numbers (Carl Jonsson – Lund University)
14:30 – 15:00	Coffee break
15:00 – 16:30	Group work + time for reflection (Vanessa Stjernborg – Lund University)

Day 2 – Inclusive Traffic Safety & Mobility: Gender Inequalities, Accessibility for all and City Walk – June 17th 2026

Time	*Activity*
09:00 – 10:00	Differences between user groups and how can they be considered? (Lena Hiselius – Lund University)
10:00 – 10:30	Coffee break
10:30 – 11:30	Rethinking inclusive mobility: Lived experiences of persons with disabilities (An Neven - Hasselt University)
11.30 – 12.00	Short introduction city walk
12:00 – 13:00	Lunch
13:00 – 14:00	City of Zagreb and mobility of people with disabilities (Marija Livajušić – Up2date organisation)
14:00 – 16:30	Walking the City Through an Equity Lens: Field Observations for Group Work
19:00	Dinner

Day 3 – Inclusive Traffic Safety & Mobility: Presentations, Discussions & Reflections – June 18th 2026

Time	*Activity*
09:00 – 10:30	Group work
10:30 – 11:00	Coffee break
11:00 – 12:00	Presentations and discussions (group work)
12:00 – 13:00	Lunch
13:00 – 14:00	Presentations and discussions (group work)
14:00 – 15:00	Closing, take aways and evaluation

Appendix 1 - List of participants

PROJECT COORDINATOR
Faculty of Transport and Traffic Sciences
University of Zagreb
Vukelićeva 4, 10 000 Zagreb, Croatia
fpz@fpz.unizg.hr

INclusive Safety & Inequality in Everyday Mobility: Advancing Equity and Traffic Safety Across Daily Travel

SIGN-IN SHEET

Zagreb, Croatia, 16.6.2026

Declaration on photography/filming

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Participant list

#	Name and surname	Institution	Signature
1	Vanessa Stjernborg	Lund uni	V.S
2	An Neven	Uthasselt	
3	Carl Johnsson	Lund Uni	CJ
4	Shirin Rizehbandi	University of Zagreb	
5	Lucija Frankovic	FTTS	
6	JASNA LEDER HORVAT	FTTS	
7	MARIJA FERKO	FTTS	
8	Lena Hirschus	Lund Uni	
9	DARIO BABIĆ	FTTS	
10	MAJA SOVINA	FTTS	
11			
12			

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Participant list

#	Name and surname	Institution	Signature
1	Kelly Hydus	Lund Uni.	
2	Vanessa Stjernborg	Lund Uni	
3	Carl Johnsson	Lund Uni	
4	Lucija Frankaić	FTTS	
5	JASNA LEDER HORIZIA	FTTS	
6	MARIJA FERKO	FTTS	
7	An Nuyn	UHasselt	
8	Shirin Rizehbandi	FTTS	
9	MAJA SOVINA	FTTS	
10	DARIO BABIĆ	FTTS	
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Participant list

#	Name and surname	Institution	Signature
1	LUCIJA FRANKAVIĆ	FTTS	
2	Carl Johnsson	Lund Uni	
3	An Neven	UHasselt	
4	MARIJA FERKO	FTTS	
5	Jenna Hirschi	Lund Uni	
6	MAJA SOVINA	FTTS	
7	Vanessa Stjernborg	Lund Uni	
8	JASNA LEDER HORINA	FTTS	
9	Shirin Ritchbandi	FTTS	
10	DARIO BARIĆ	FTTS	
11			
12			

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Appendix 2 - Workshop materials

ADVANCING ROAD SAFETY THROUGH TWINNING

Call: HORIZON-WIDERA-2023-ACCESS-02

Topic: HORIZON-WIDERA-2023-ACCESS-02-01

Type of action: HORIZON Coordination and Support Actions

Granting authority: European Research Executive Agency

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INSIGHT (INclusive Safety & Inequality in Everyday Mobility) – Summer School 2026

Photo by Alexandre Contador on Unsplash

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The aim of the summer school

To explore how traffic safety and everyday mobility are shaped by diversity, equity, and inclusion (DEI), and how transport systems can become safer, fairer, and more accessible for everyone

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To increase the understanding of…

- how factors such as gender, age, socioeconomic status, ethnicity, and disability influence people's ability to move safely and freely
- how structural inequalities affect mobility patterns, transport risks, and access to opportunities
- how traffic safety outcomes are unevenly distributed across different social groups

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Assignment step	Link with lecture	Guiding questions
1. Define the problem	Vanessa	What is the broader road safety/equity issue? Who benefits and who is disadvantaged?
2. Actual safety and data	Carl	What do accident numbers show? What might be underreported or invisible in official data?
3. Differences between users	Lena	How may gender, age, norms, abilities or socio-economic position change the experience of this place?
4. Lived experience and hidden barriers	An+ NGO	Which barriers affect autonomy, perceived safety, predictability, accessibility or spontaneous travel?
5. City walk observations	All lectures	What do we see in the urban environment? Which critical moments illustrate the problem?
6. Recommendations	All lectures	Which interventions address both safety and equity? Who should be involved?

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To do

- Choose a scenario (develop your own or receive one)
- Formulate your initial assumptions. At this stage, the scenario would mainly function as a starting lens:
    - What is the broader road safety problem, who might be affected, and what equity issues may be involved?
- Then revisit the same scenario after each lecture, adding one analytical layer:
    - Transport equity & social impact (Vanessa)
    - Actual safety, data & underreporting (Carl)
    - User-group differences & norms (Lena)
    - Lived experiences, accessibility & hidden mobility burdens (An).

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City walk

During the city walk:

- Observe concrete places or route segments
- Focus on one or two critical moments in the mobility chain

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Final presentation

- Scenario and safety challenge
- Affected user groups
- City walk observations
- Hidden barriers or avoided trips
- Recommendations

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Time	*Activity*
10:30 – 11:00	Coffee
11:00 – 12:00	Introduction and get to know each other + discussion
12:00 – 13:00	Lunch
13:00 – 14:00	Behind the numbers: The Intersection of Transport Equity & Traffic Safety Vanessa Stjernborg – Lund University
14:00 – 14:30	Coffee break
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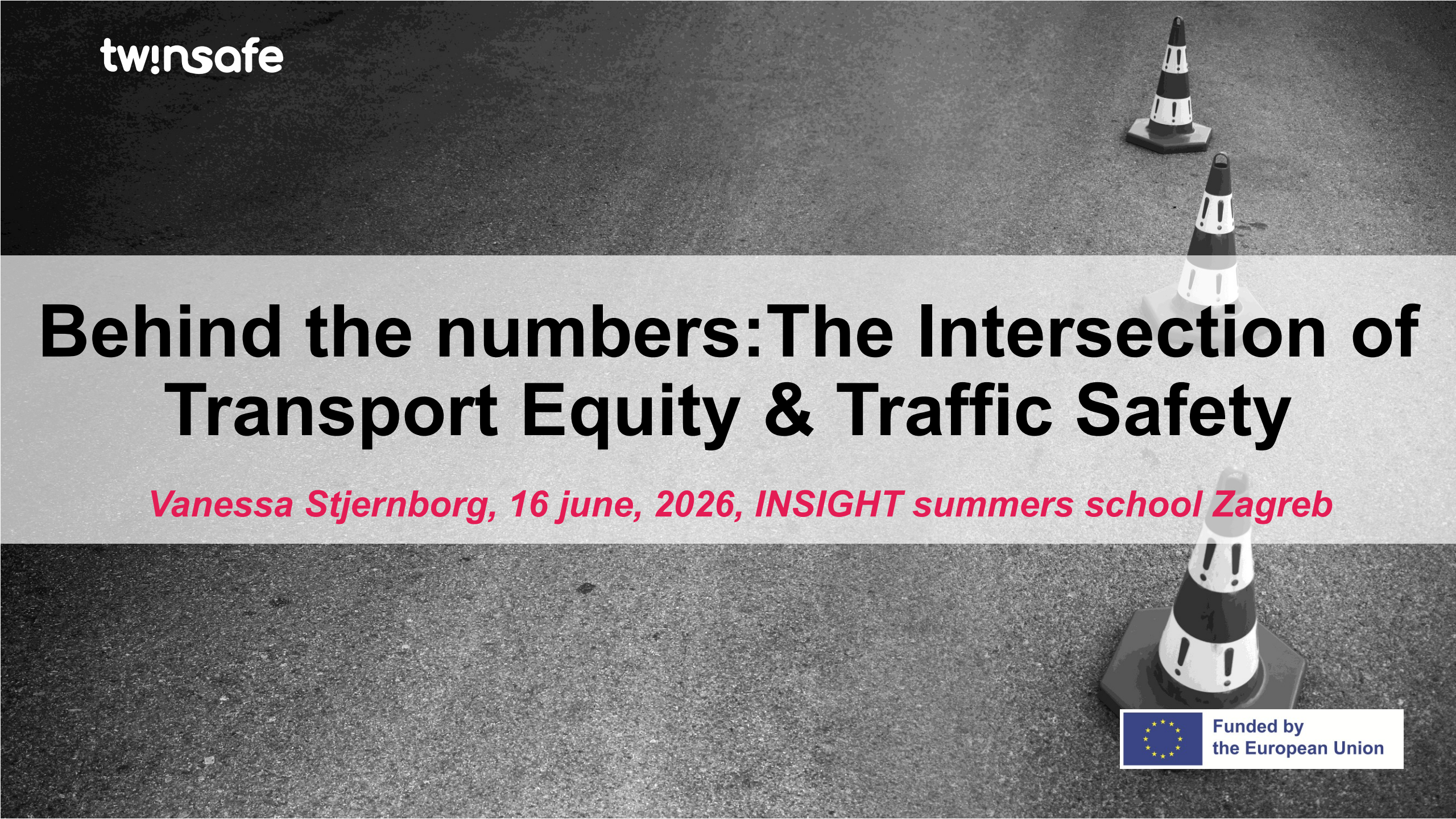
Behind the numbers:The Intersection of Transport Equity & Traffic Safety

Vanessa Stjernborg, 16 june, 2026, INSIGHT summers school Zagreb



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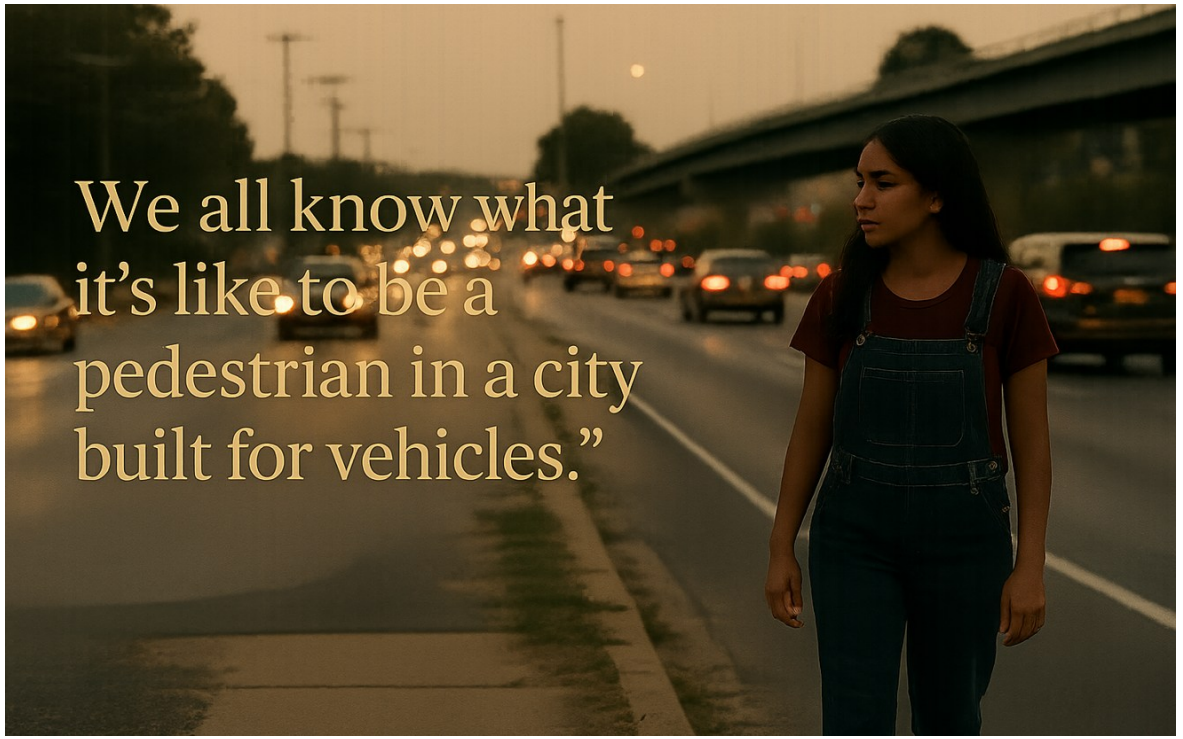
”To be a pedestrian in a city built for vehicles”

“We all know what it’s like to be a pedestrian in a city built for vehicles. As a teenager, I would have to walk from my house to my part time job at the local mall. As a pedestrian, I would have to navigate inconsistent sidewalks... You know the ones that just start and stop randomly, or the ones that turn into tiny slivers you have to maneuver or they push you into the street… and as an added bonus, on my commute I had to carefully cross a bustling onramp that led to a sprawling highway system. I couldn’t always take the bus to the mall, because I didn’t always make enough money, and no money means no option for a car or a bike either”….

Tatiana Quiñones, 2023 (researcher, activist and entrepreneur)

[The intersection of transportation & equity | Tatiana Quiñones | TEDxNorthampton Community College]



Picture created by copilot, 2026

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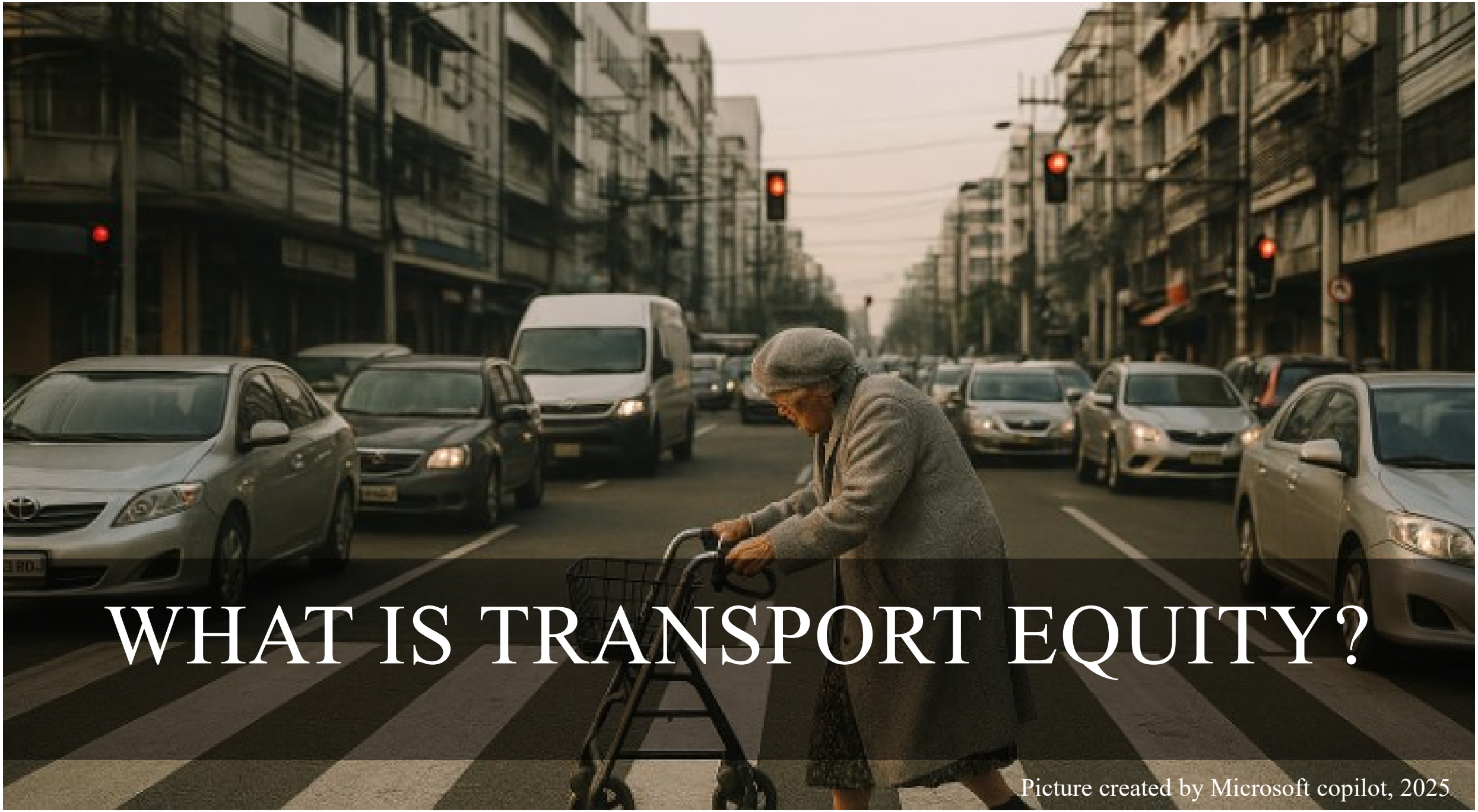

WHAT IS TRANSPORT EQUITY?

Picture created by Microsoft copilot, 2025

Suggestions?

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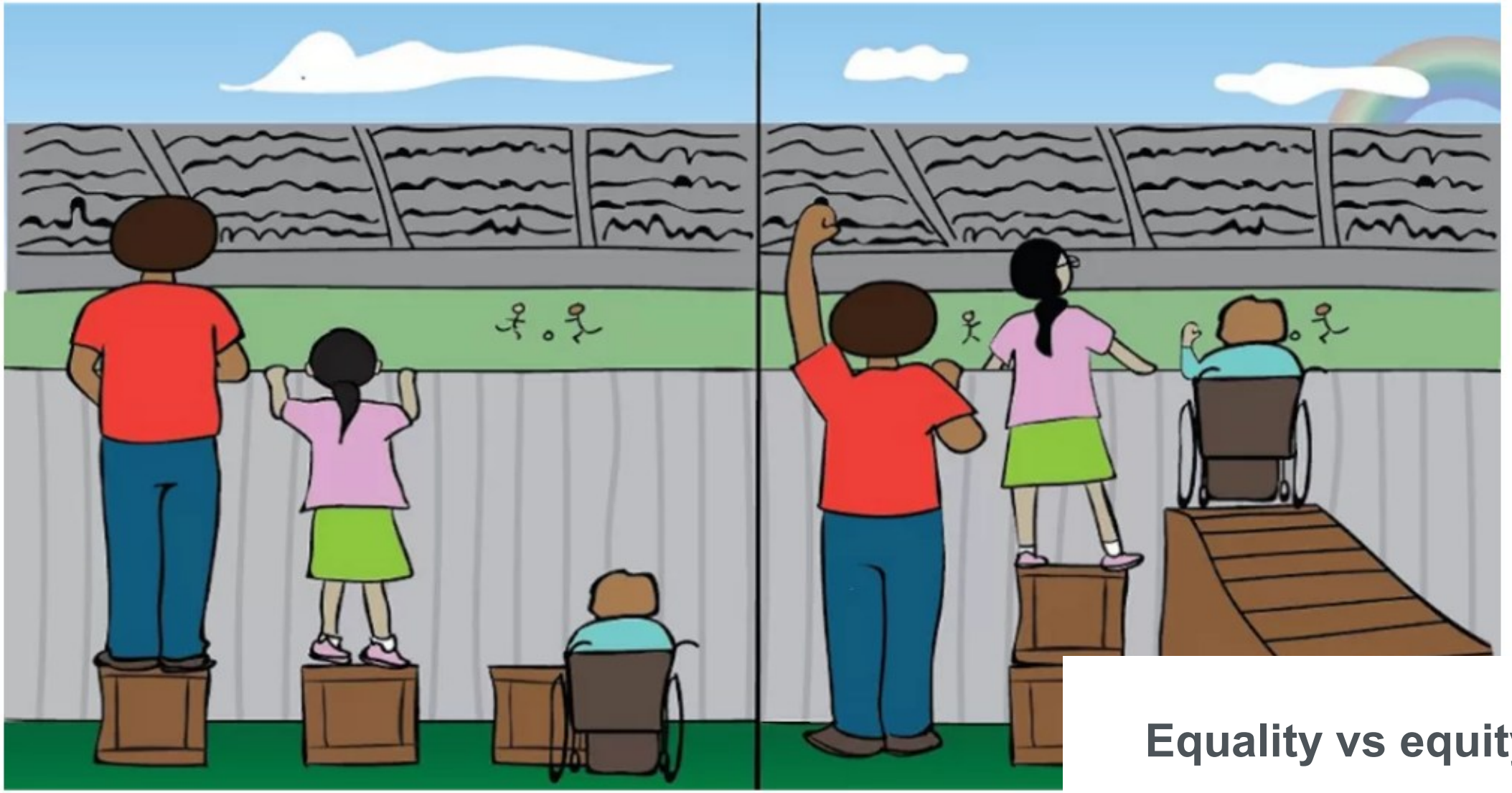

Equality vs equity

By Beverly Ward

Source: Equality -> Equity -> Justice: The Transportation Case Example - QEW

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Related to other notions

Equity: aims to reduce inequalities and is linked to *justice* and *fairness* (Bruzzone, Cavallaro & Nocera, 2023)

- **Equality** – same resources and opportunities for all (e.g., same number of bus stops, equal accessibility of buses)
- **Equity** – fairness based on people's different needs (e.g., more frequent services in low-income areas, accessible transport for people with various disabilities)

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Transport Equity

Equity in transportation seeks:

- Fair mobility and accessibility for all
- To support social and economic opportunities
- Access to affordable, reliable transport based on different needs
- A focus on underserved populations, including:

low-income groups, minorities, older adults, children, people with limited language proficiency (LLP), and persons with disabilities.

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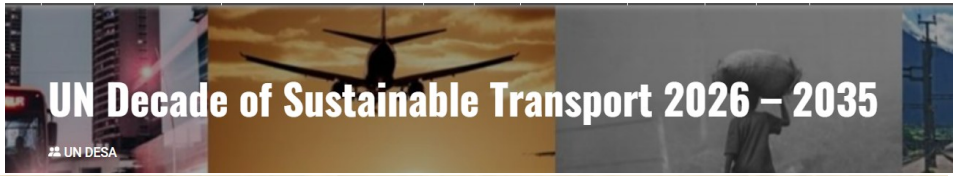
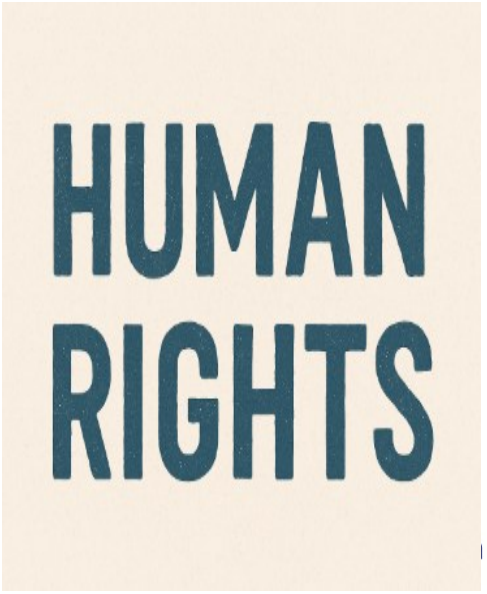
Sustainability, Rights, and Inclusion





Mobility

- Mobility is understood as movement from one place to another
- Transport research has traditionally focused on physical movement
- A shift occurred in the early 2000s: mobility is more than physical movement between point A and B
- Power relations and individual conditions influence mobility practices (different capacities – different resources)

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Mobility Shapes Lives

Social Impact of Mobility

Mobility influences community connections and social inclusion (or exclusion).

Mobility and Opportunity

Reliable transport connects people to jobs, education, and healthcare, enhancing life chances.

Transport Safety

Safety in transport is crucial, especially for vulnerable groups like children and older people.

Human-Centered Design

Transport systems should prioritize human life, dignity, equitable and equal access.

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Uneven Mobilities

Marginalized Groups at Risk

Low-income communities, ethnic minorities, children, older people and people with disabilities may face higher transportation safety risks due to systemic inequities.

Infrastructure Challenges

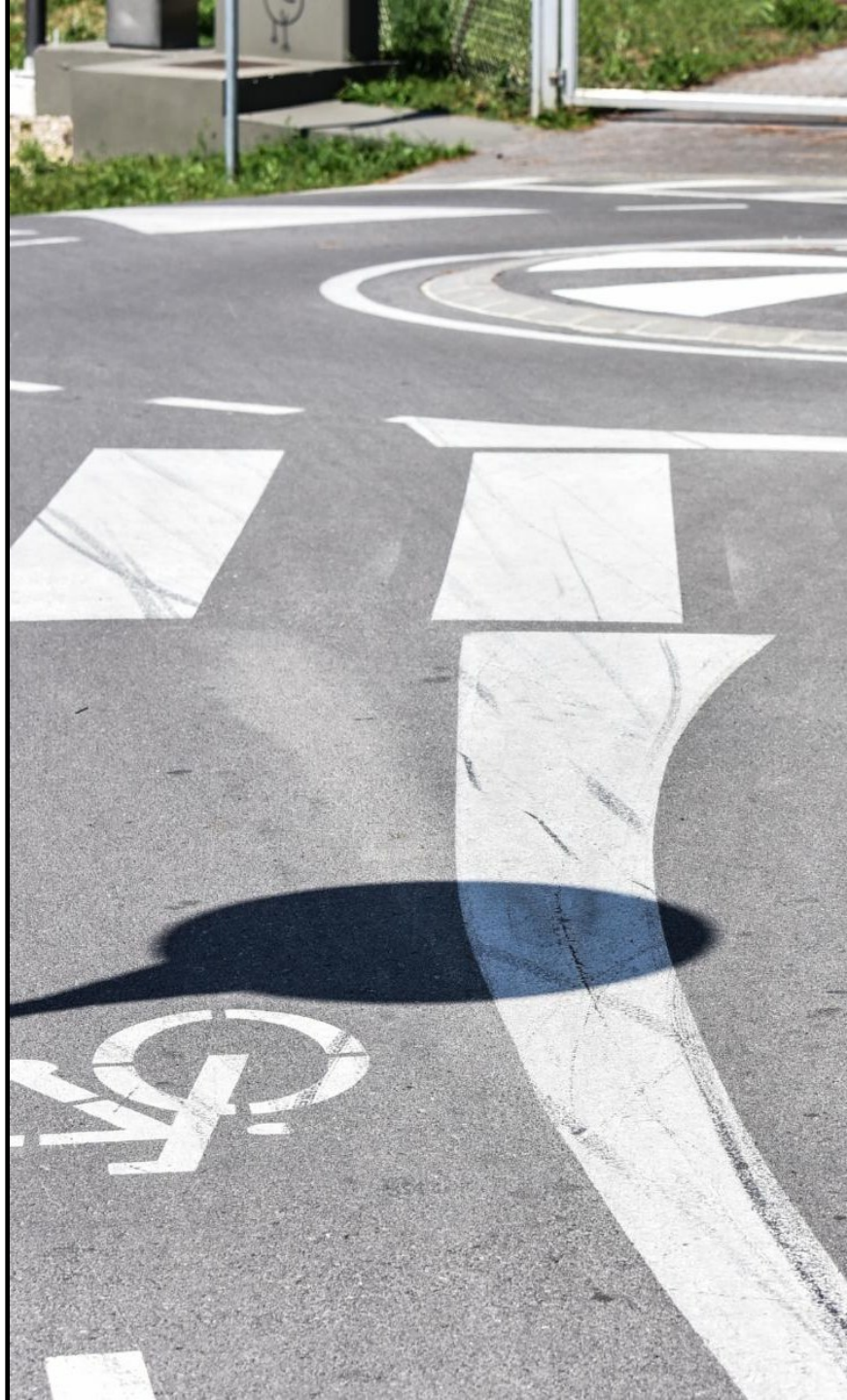
Lack of safe infrastructure like sidewalks, bike lanes, and accessible transit increases risks for vulnerable populations (e.g., many times poorer infrastructure in low-income communities).

Impact on Independence

Inaccessible public transport and crossings can limit mobility and independence for e.g., people with disabilities, older people, children.

Toward Safety for All

Recognizing different groups enables targeted interventions to redesign transport systems for everyone’s safety.



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The intersection between transport safety and transport equity

"Our mobilities can unite or divide communities, enhance or hinder opportunities, and quite literally be a matter of life or death."

"The study of transportation safety is really just looking at humans and their chosen forms of transportation" (Quiñones, 2023)

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What can be done to ensure safe travel for all?

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Transport safety disparities

Not everyone faces the same level of risk in transportation.

- Again - not everyone has the same resources and capacities to be mobile
- Some communities may face higher rates of traffic fatalities (e.g., often low-income communities, ethnic minority groups) because of poor infrastructure and/or limited individual possibilites
- People walking and biking may face greater safety challenges

These disparities are driven mainly by structural inequalities — not individual choice.

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Inequalities in transport access

- “Multi-layered exposure”
- Lower-income communities are more often located near high-traffic roads (often lower land-value prices)
- Households in these areas may be less likely to own a vehicle
- Access to safe walking and biking infrastructure may be more limited
- Often limited public transport options (especially for lower-paid jobs where people often work shifts, for example e.g., *transport poverty*)

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Double Injustice: Who benefits and who is disadvantaged?

Low-income groups contribute less to consumption and climate change, yet are disproportionately affected by its negative impacts and have limited means to cope (Gough, 2017)

App. 80 percent of the world's population has never flown.

One percent of the world's population accounts for more than 50 percent of flight emissions (Gössling, 2020).

The richest 10% of households produce: 3× more CO_2 than the poorest 10% overall

- Over 7× more from road transport
- 10× more from air travel (Mona Chitnis et al., 2014)

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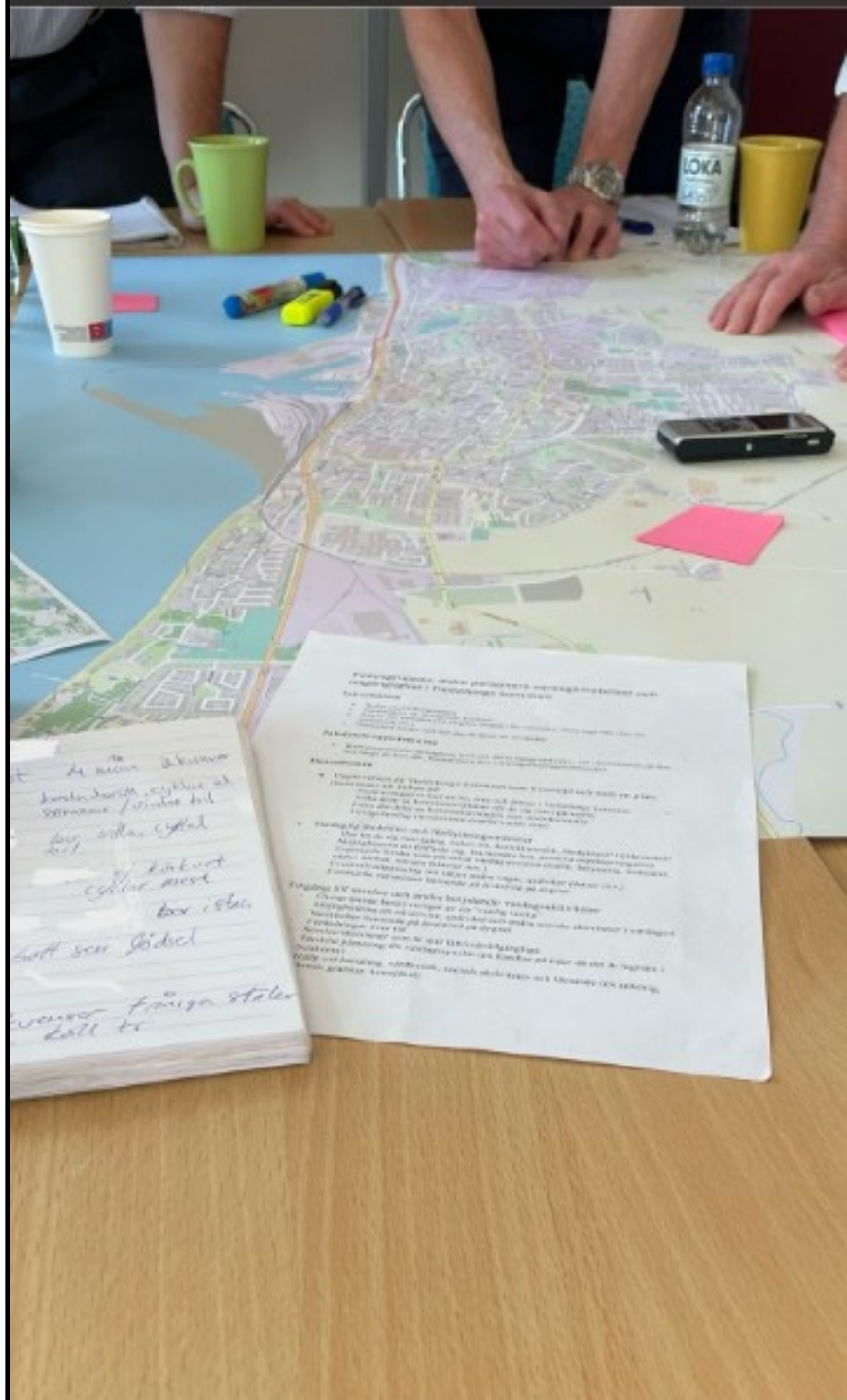
Inclusive Planning

Inclusive Planning Processes

- Plan-making and implementation processes where *all* community members feel welcome and confident their participation matters.
- Goes beyond simply inviting everyone; requires understanding for systemic inequities and lack of trust (e.g., discriminatory practices).
- Planners and officials must learn how these barriers affect participation and adapt methods accordingly.
- Planners/decision makers must be willing to listen to new voices, acknowledge past mistakes, embrace alternative participation methods, and share authority with locals (they are the experts).

(American Planning Association, 2019)



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Inclusion in the planning process can increase public acceptance of the project – the feeling of “being heard,” even if negative impacts remain.

- Human in the centre
- Based on democracy and human rights
- Inclusion in the planning process is a fundamental factor in a democracy (strengthens democracy)
- Local residents as the “experts”

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Social Impact Assessment (SIA)

Emerged in the 1970s with growing interest in environmental impacts – how are humans affected?

“the processes of analyzing monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions” (Vanclay, 2003a, s 6).

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Why….?

- A process to highlight people's different life situations, conditions, and needs when a physical change is to be implemented.
- Increase knowledge about the place/context and identify important social aspects.
- Assess the consequences of different proposed changes (positive/negative social effects).

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Barriers and social segregation

Urban zoning laws as mechanisms for social segregation - RTF | Rethinking The Future

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International Guidelines for Social Impact Assessment (SIA)

- Iterative process to positively influence project outcomes (should continue throughout the decision-making process) and should start at an early stage.
- One of the cornerstones is involving those who are affected:
  - Participation and community engagement are considered essential for identifying and assessing social impacts/consequences.
  - Special focus on groups that might otherwise be less visible in the planning process.

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Key Principles for Social Impact

- Social groups and social contexts differ
- Requires flexibility in approach and method
- Social impacts with openness – includes everything that affects people
- The boundaries between social, environmental, and economic impacts are fluid
- Give space and power to local communities to participate in decision-making
- Combine qualitative and quantitative methods

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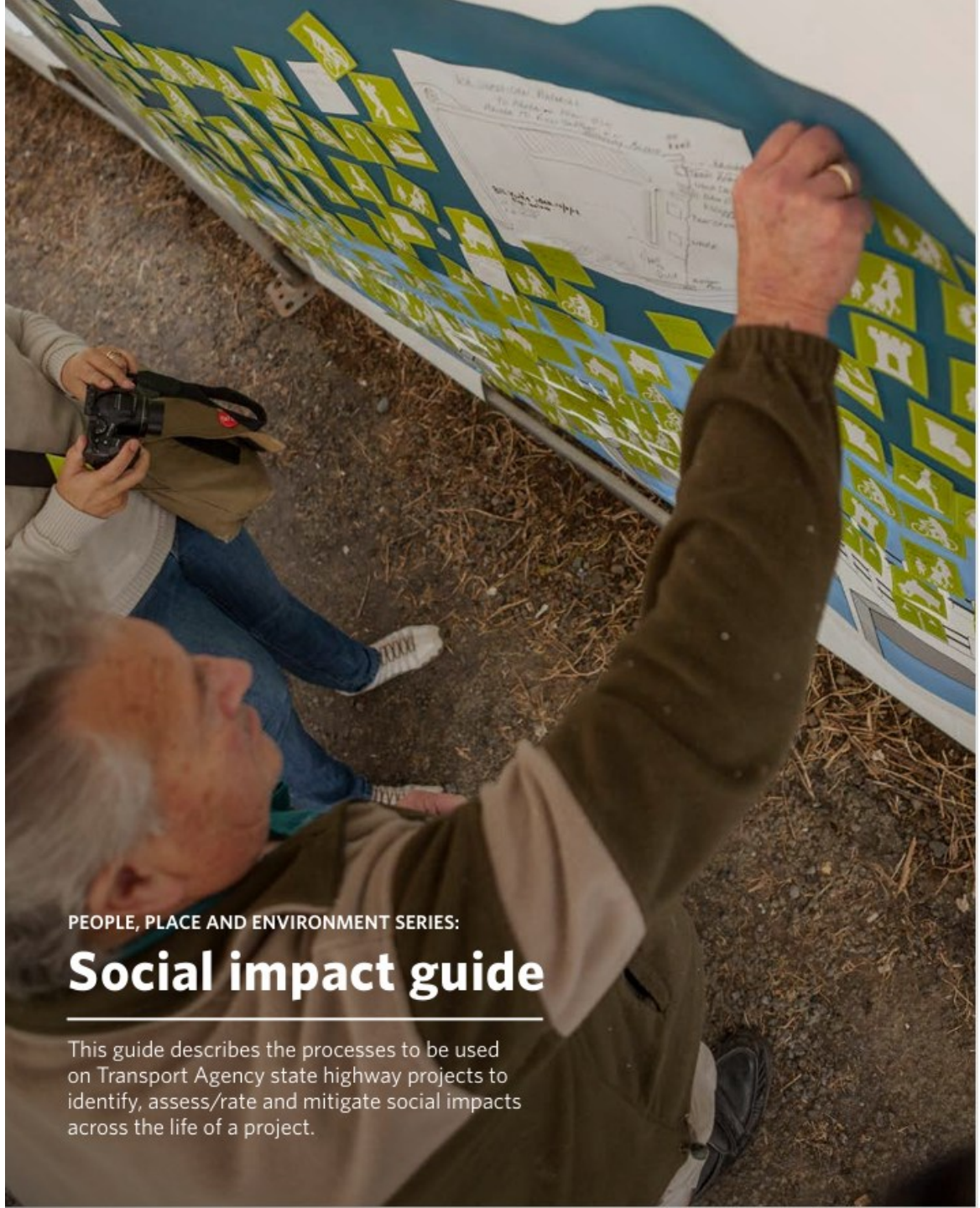
Social Responsibility



iRAP

- ”safer and better roads for everyone” – wheter that be pedestrians, for cyclists, for motorcyclists or for vehicle occupants”

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”THE BEST PEOPLE TO TALK TO ARE THE LOCAL COMMUNITIES WHO LIVE BESIDE SOME OF THESE ROADS. THEY'VE GOT THIS WEALTH OF EXPERIENCE FROM GENERATIONS LIVING IN THE PLACE AND THEY OFTEN SEE THE ROAD CHANGE AND THEY ARE OFTEN THE ONES TO COME UP WITH THE PRACTICAL SOLUTIONS, LIKE SLOW THE TRUCKS DOWN THAT ARE GOING THROUGH MY VILLAGE, GIVE ME A PEDESTRIAN CROSSING SO THE TRUCKS HAVE TO STOP,GIVE ME A SIDEWALK THAT I CAN WALK ON. THESE ARE PEOPLE, NOT ENGINEERS, NOT WITH UNIVERSITY TRAINING. JUST PEOPLE WHO THEIR LIVED LIFE HAS EQUIPPED THEM WITH SORT OF AN UNDERSTANDING OF THE CHALLENGES AND SOLUTIONS.”

GREG SMITH CHIEF EXECUTIVE OFFICER, IRAP

[Home - iRAP International Road Safety Assessment Programme | iRAP]

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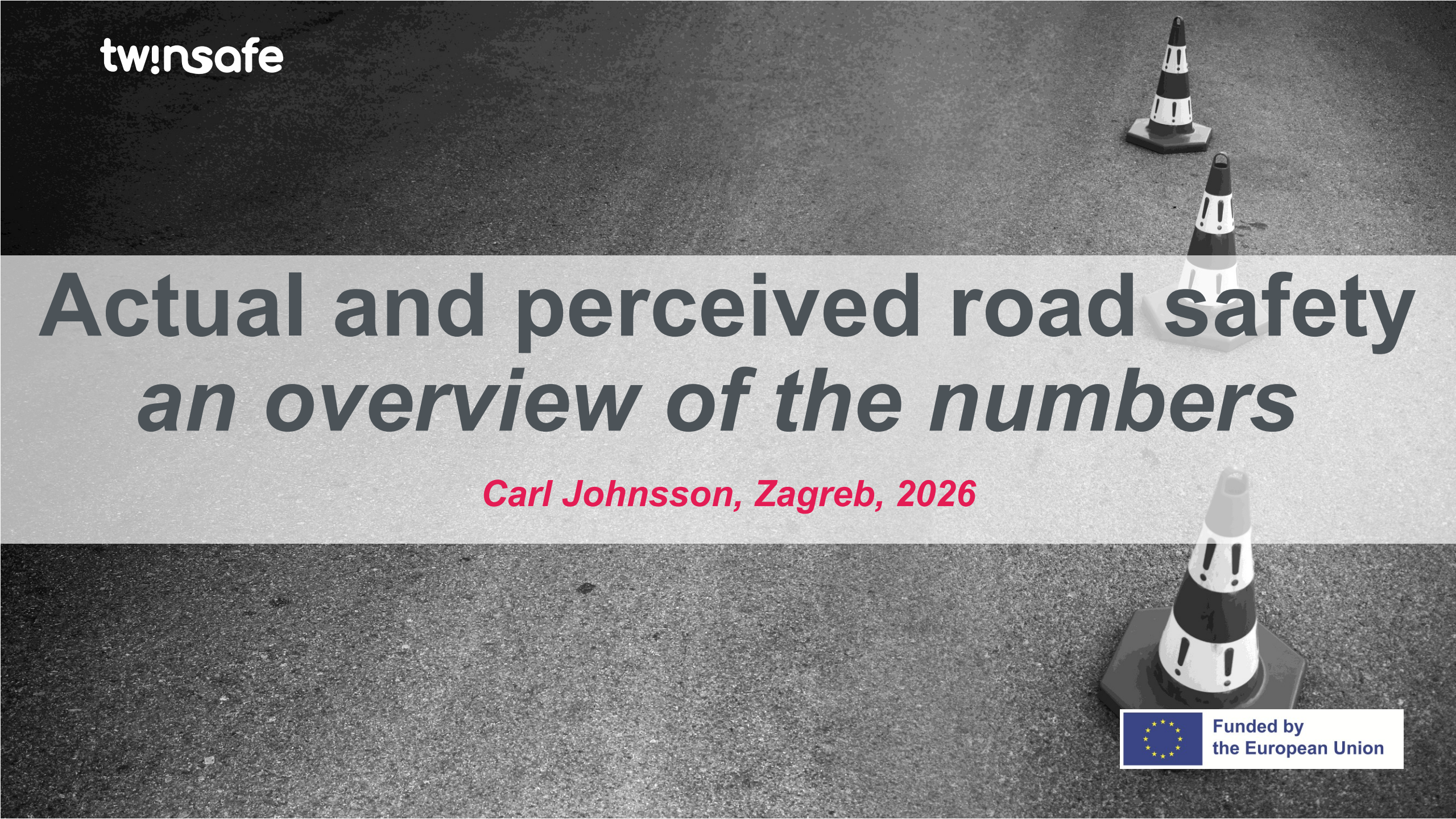
Actual and perceived road safety *an overview of the numbers*

Carl Johnsson, Zagreb, 2026



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This presentation

- Concepts
  - Actual – Objective safety
  - Perceived – Subjective safety
- Objective safety -Numbers
  - More numbers
  - Some more numbers
- Perceived safety - Numbers
- Objective and Subjective safety - Road measures

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Actual – Objective safety

- Accidents – Crashes
- Road safety fatality – any person who dies immediately or within 30 days of a crash as a result of their injuries, provided the incident involved at least one moving vehicle on a public road.
- Injury – Serious/Slight - MAIS (Maximum Abbreviated Injury Scale) score of 3 or more (MAIS3+)

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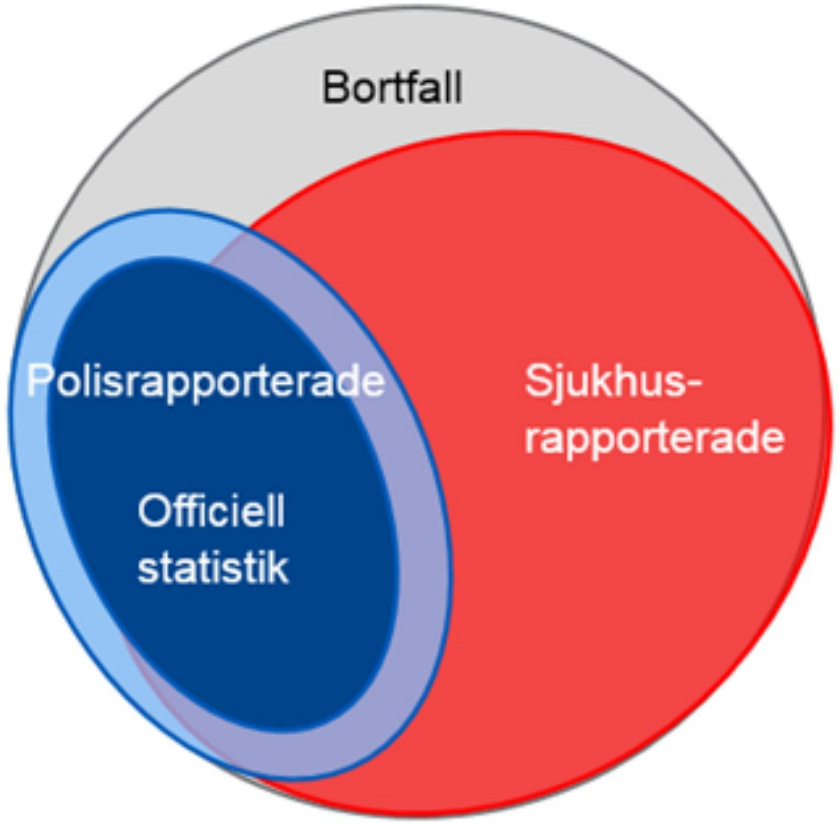
Accident/Crash data

- Police
- Hospital



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Exposure data

- More traffic leads to more accidents

- Population, number of vehicles
- Travel length, Travel duration

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Perceived – Subjective safety – Security

- **Feeling of safety** - How people subjectively experience accident risk in traffic.

- The concept consists of two parts; an emotional component which among other factors include insecurity, fear, anxiety and worry, and a cognitive component which represents the perceived risk of an accident or injury

- Subjective safety is the sum of two thoughts; the possibility for an accident and the consequence of a possible accident

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Subjective and Objective Safety - The Effect of Road Safety Measures on Subjective Safety among Vulnerable Road Users - TØI report 1009/2009, Michael Sørensen and Marjan Mosslem

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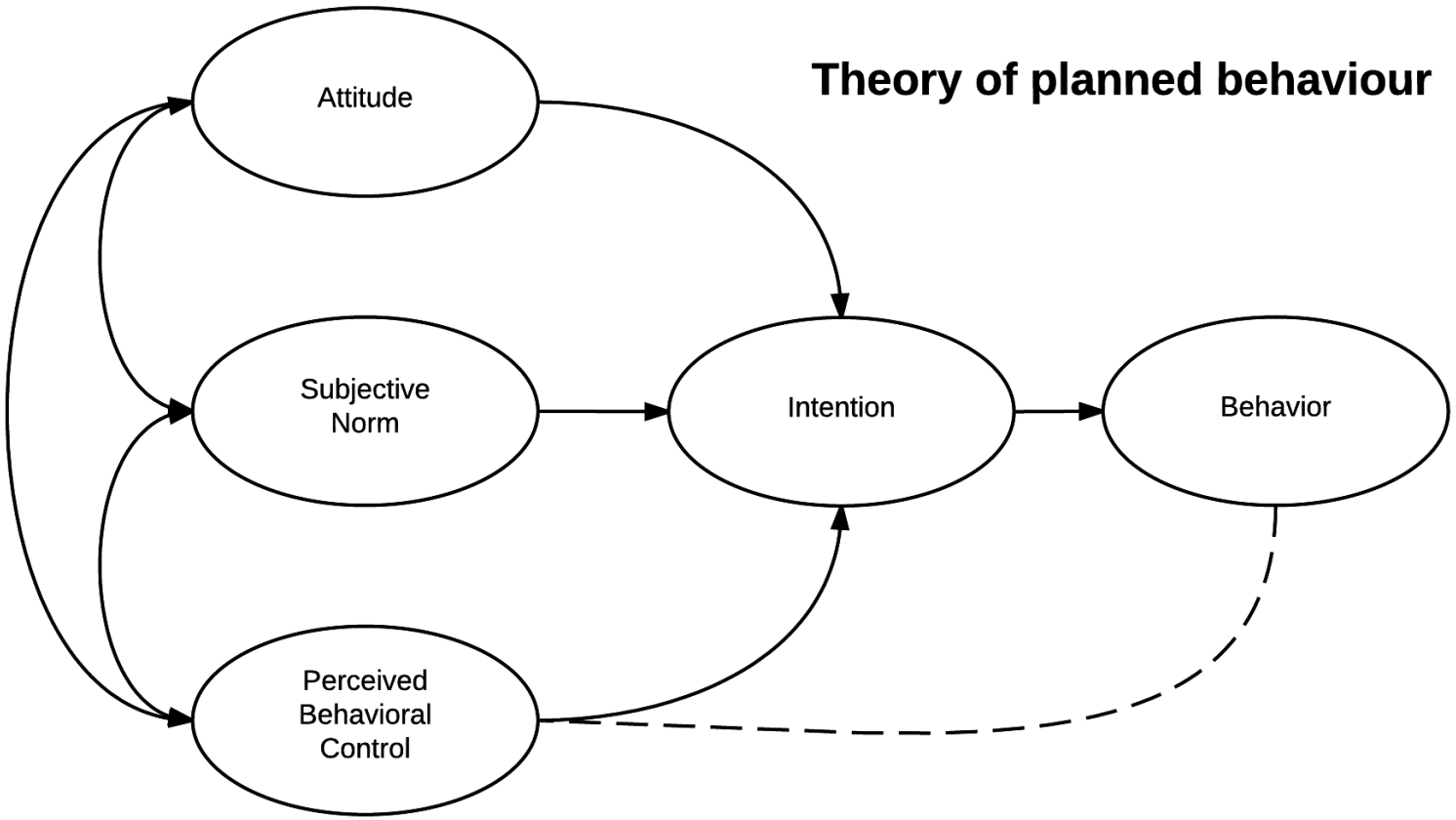
Subjective safety influences Choice

- Travel mode
- Route
- etc.



Perceived – Subjective safety

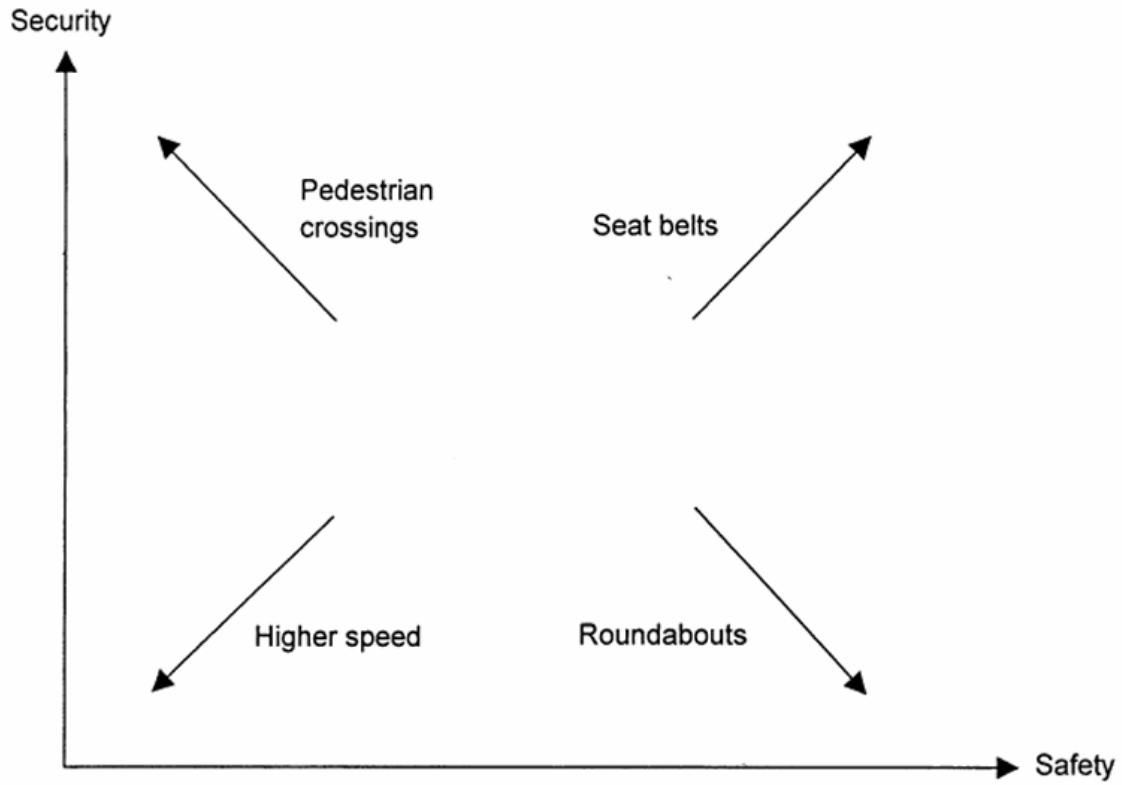


Figure 2.3. Potential relationship between effects on safety (objective safety) defined as the actual number of accidents and effects on security (subjective safety) defined as feeling of safety for four safety measures (Elvik 2000).

Subjective and Objective Safety - The Effect of Road Safety Measures on Subjective Safety among Vulnerable Road Users - TØI report 1009/2009, Michael Sørensen and Marjan Mosslem

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EU numbers

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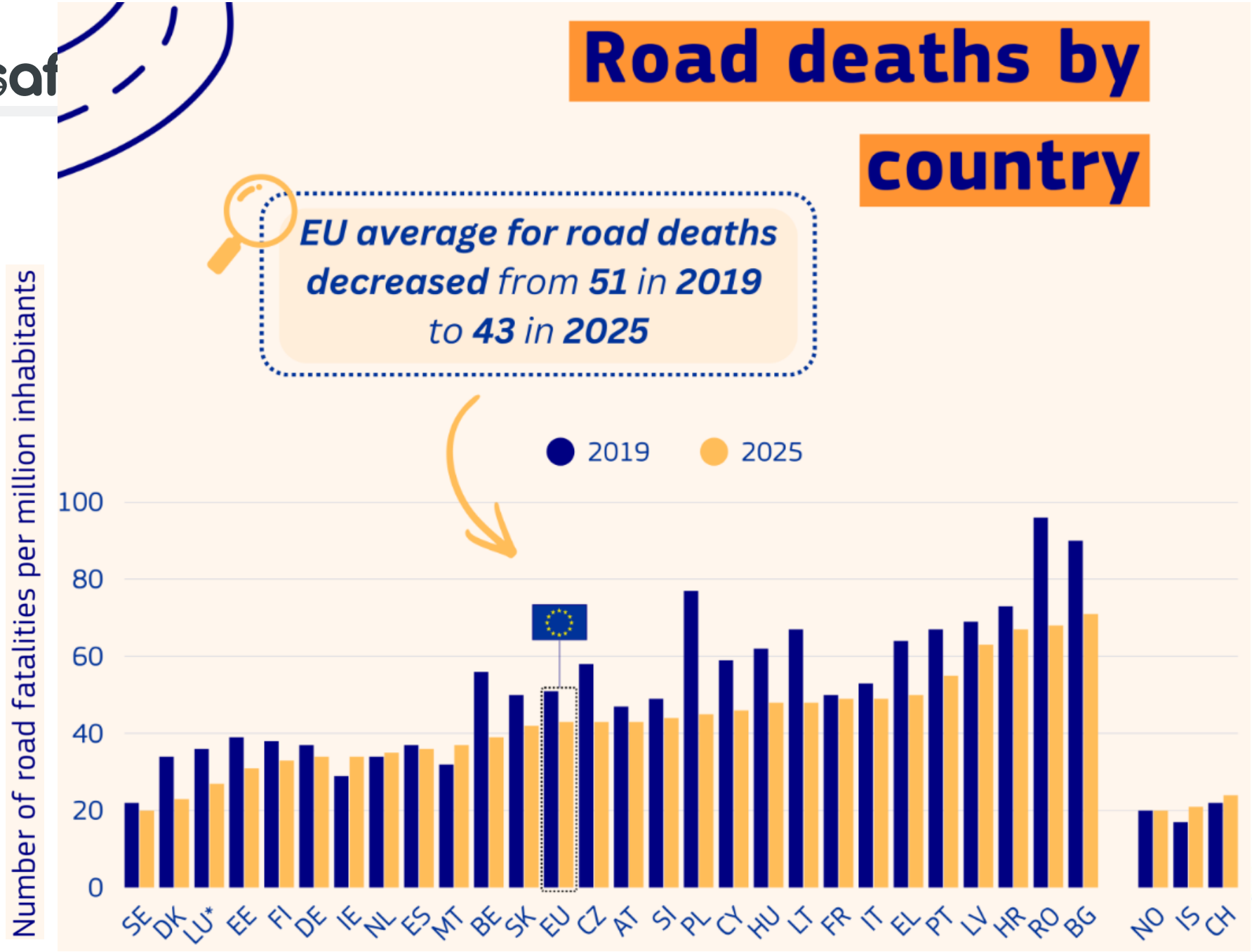

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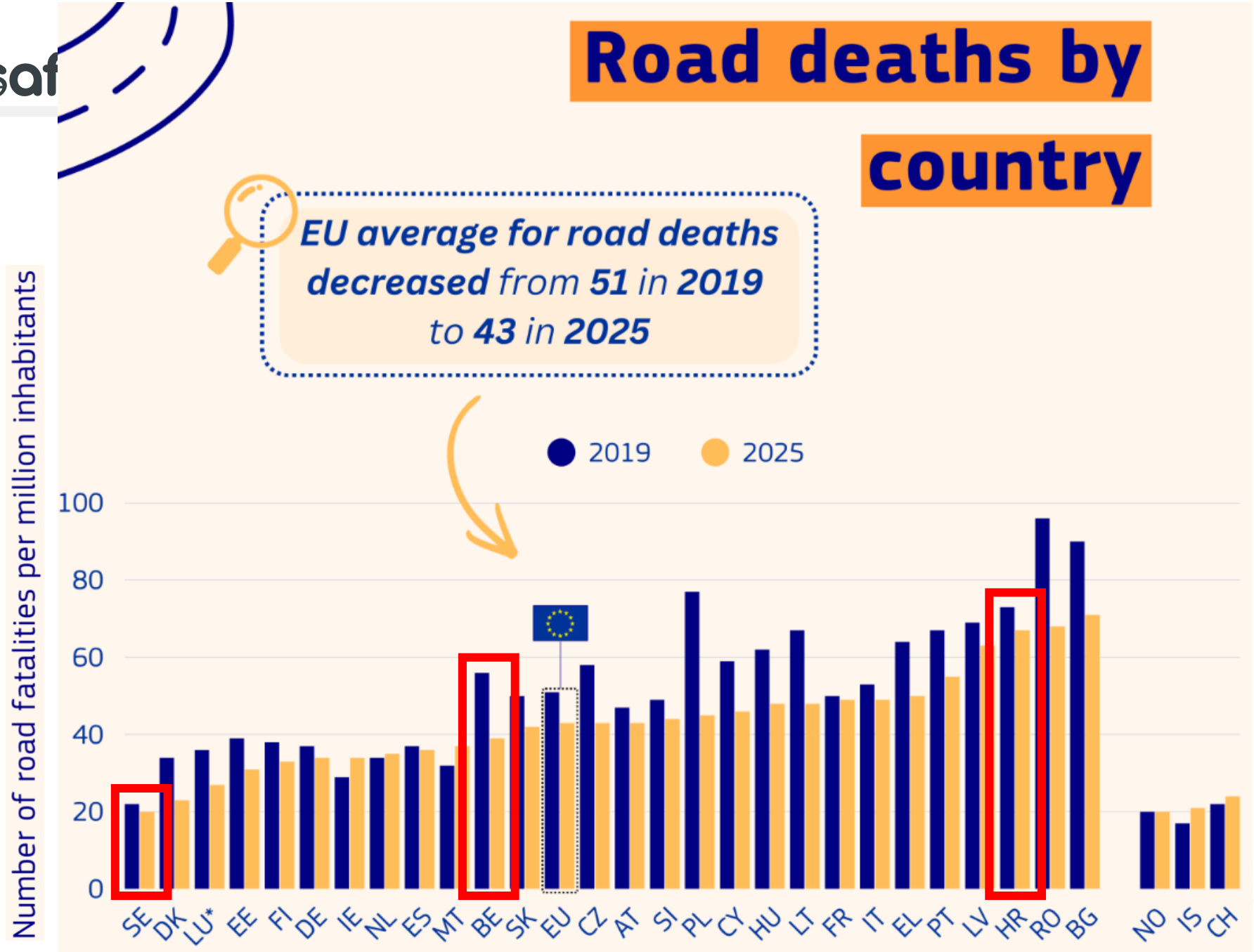
https://transport.ec.europa.eu/background/road-safety-statistics-2025_en



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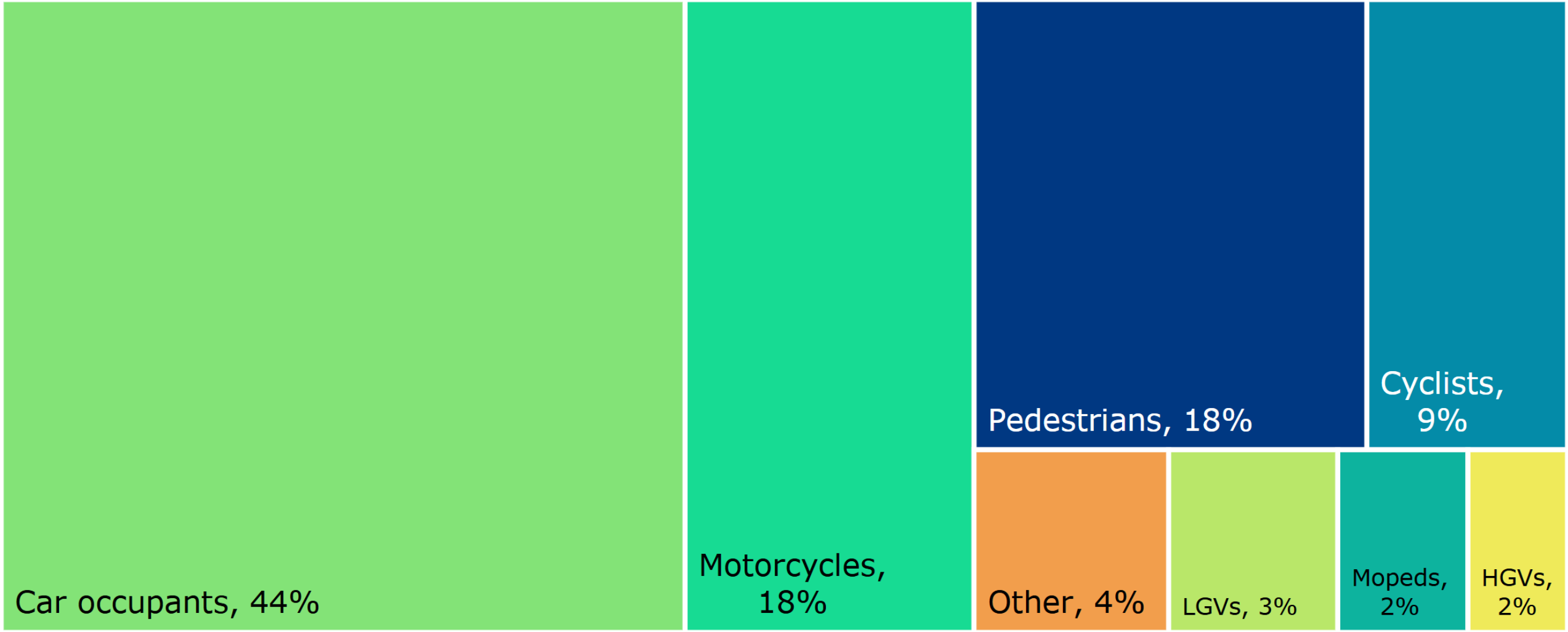
https://transport.ec.europa.eu/background/road-safety-statistics-2025_en

Fatalities



https://road-safety.transport.ec.europa.eu/document/download/ed29ad84-b2f1-429e-97ca-2b713e7dc1b1_en?filename=ERSOnext_AnnualReport_20260323.pdf

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ROAD TRAFFIC FATALITIES IN THE EU IN 2024

by road user and (other) 'main vehicle' involved in the crash

FATALITIES

IN A COLLISION WITH...

	Pedestrian	e-scooter	Bicycle	Moped	Motorbike	Car	Lorry (<3.5t)	Heavy goods vehicle (>3.5t)	Bus or coach	Other vehicle / unknown	No other vehicle involved	TOTAL
Pedestrians	-	10	18	12	96	2302	414	391	127	190	-	3560
e-scooter riders	1	1	2	0	0	57	6	8	4	3	66	148
Cyclists	9	0	52	6	46	817	122	175	28	66	498	1819
Moped riders	2	0	1	2	12	204	43	32	8	26	148	478
Motorcyclists	16	0	7	7	132	1583	232	205	38	119	1345	3684
Car occupants	16	1	13	5	17	2675	548	1284	147	201	3805	8712
Lorry (<3.5t) occupants	0	0	2	0	1	98	68	172	15	20	245	621
Heavy goods vehicle (>3.5t) occupants	0	0	0	0	0	49	13	152	2	11	138	365
Bus or coach occupants	1	0	0	0	1	7	4	3	1	7	36	60
Other/unknown	1	0	0	0	5	136	32	37	7	28	261	507
TOTAL	**46**	**12**	**95**	**32**	**310**	**7928**	**1482**	**2459**	**377**	**671**	**6542**	**19954**

European Commission

Methodological note: the data cover fatalities in single-vehicle crashes and crashes involving one or more traffic units. For the majority of fatal crashes, only one other vehicle is involved in the crash. For multi-vehicle crashes, the 'main vehicle' is the heaviest of the vehicles involved as this tends to be responsible for the most serious consequences. As a result, the figures in each column likely underestimate the number of cases a particular vehicle was involved in a crash. E-scooters include other forms of motorised micro-mobility devices. Source: EU CARE database on road crashes.

Data refer to the year 2024 except for Greece, Cyprus, Malta, Portugal, Slovenia and Finland for whom the data refer to 2023.

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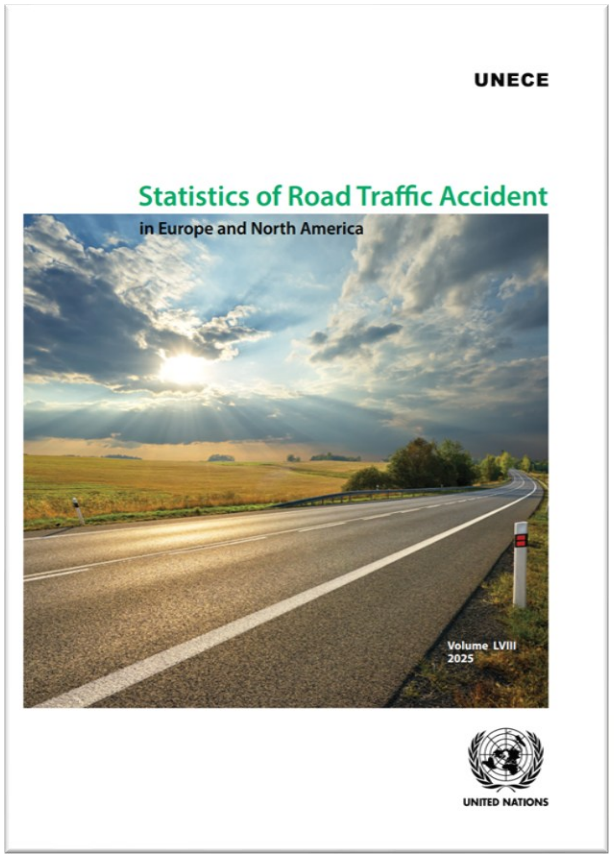
More numbers



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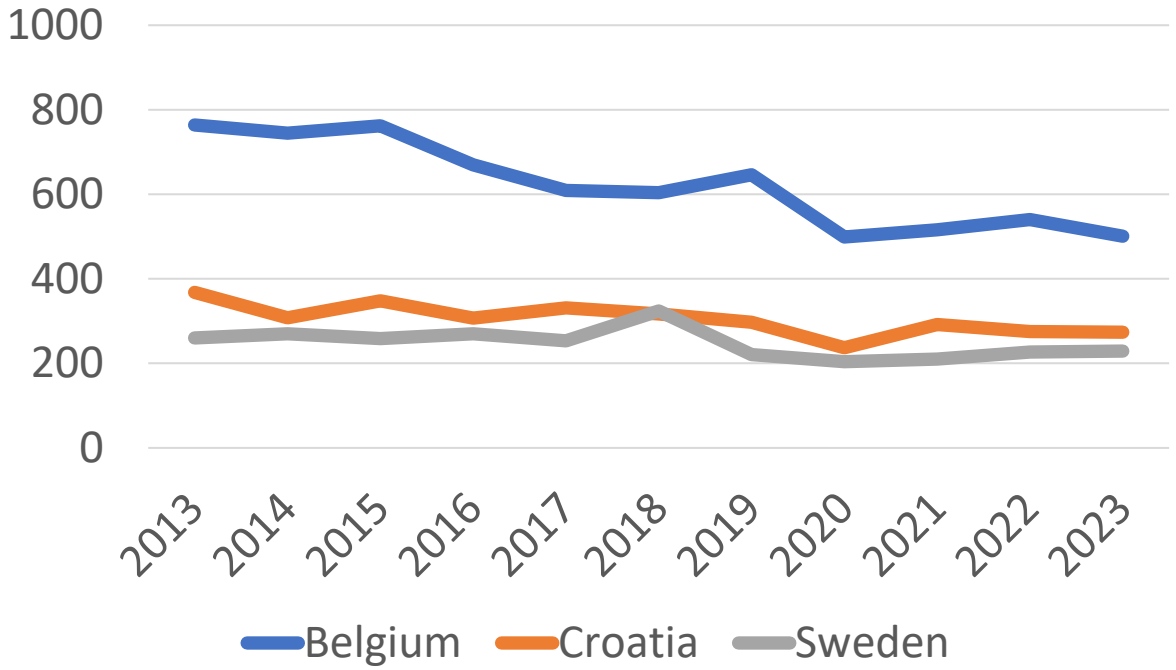
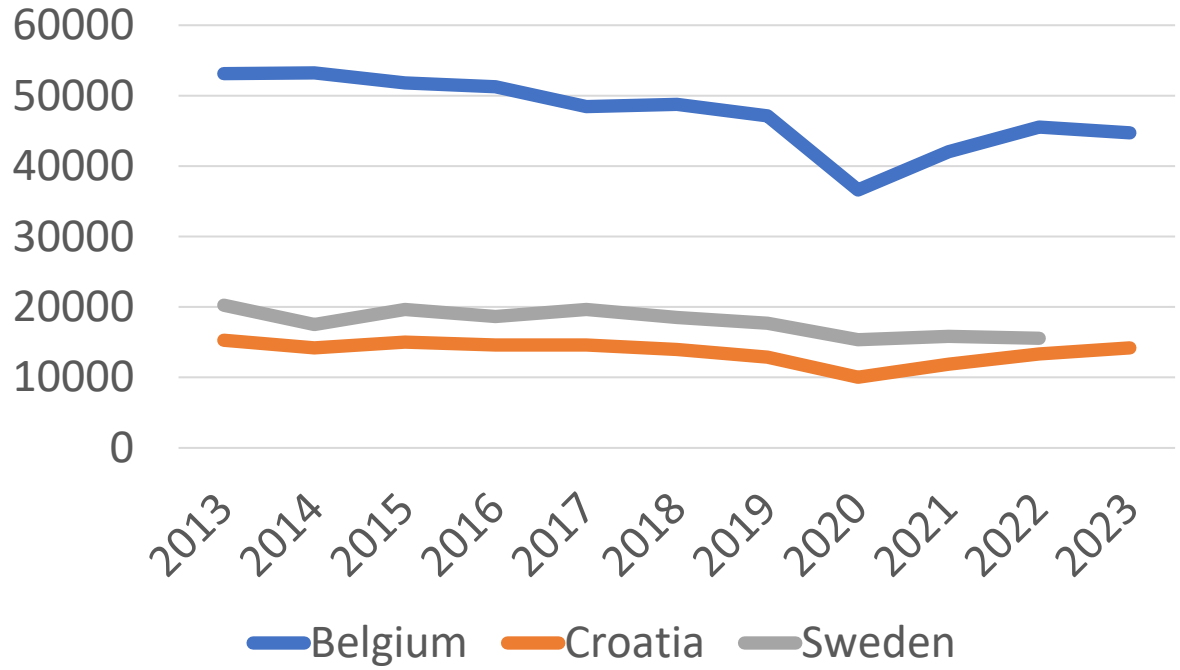
Number of persons killed in road traffic accidents, 2013-2023



Number of persons injured in road traffic accidents, 2013-2023



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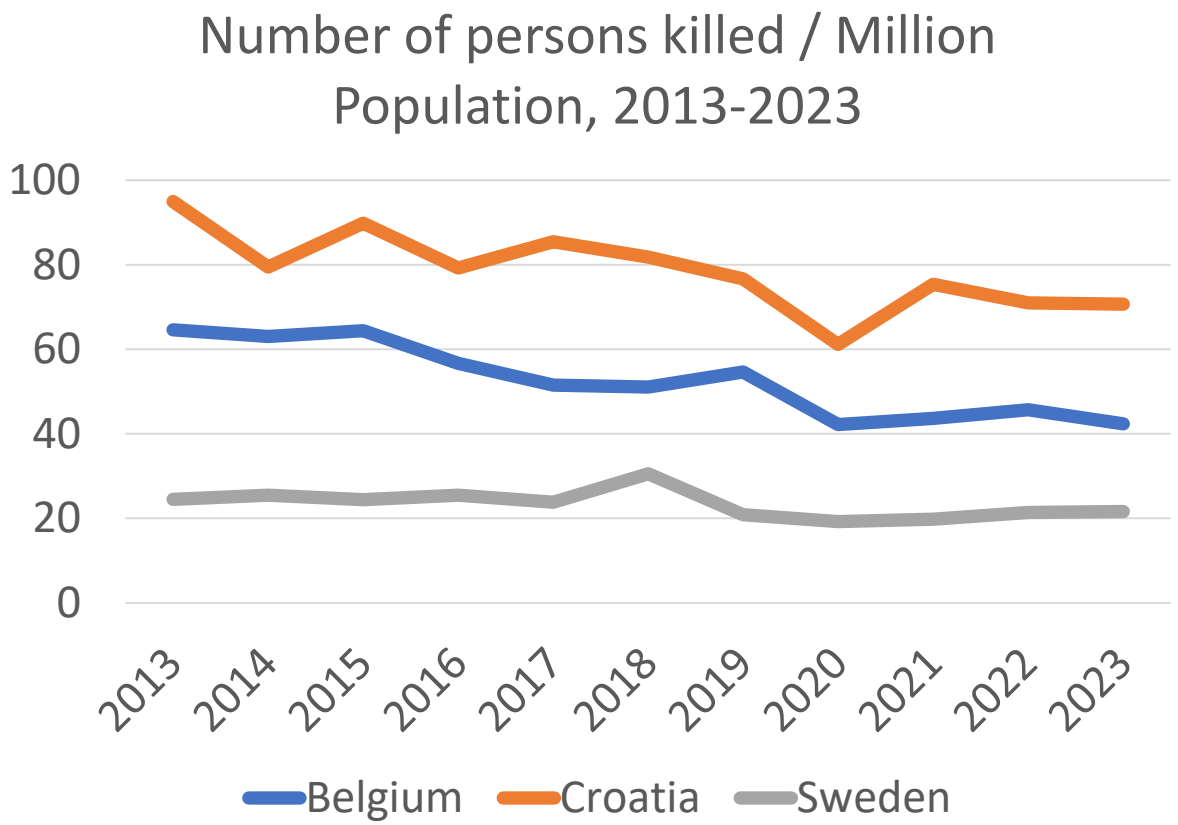

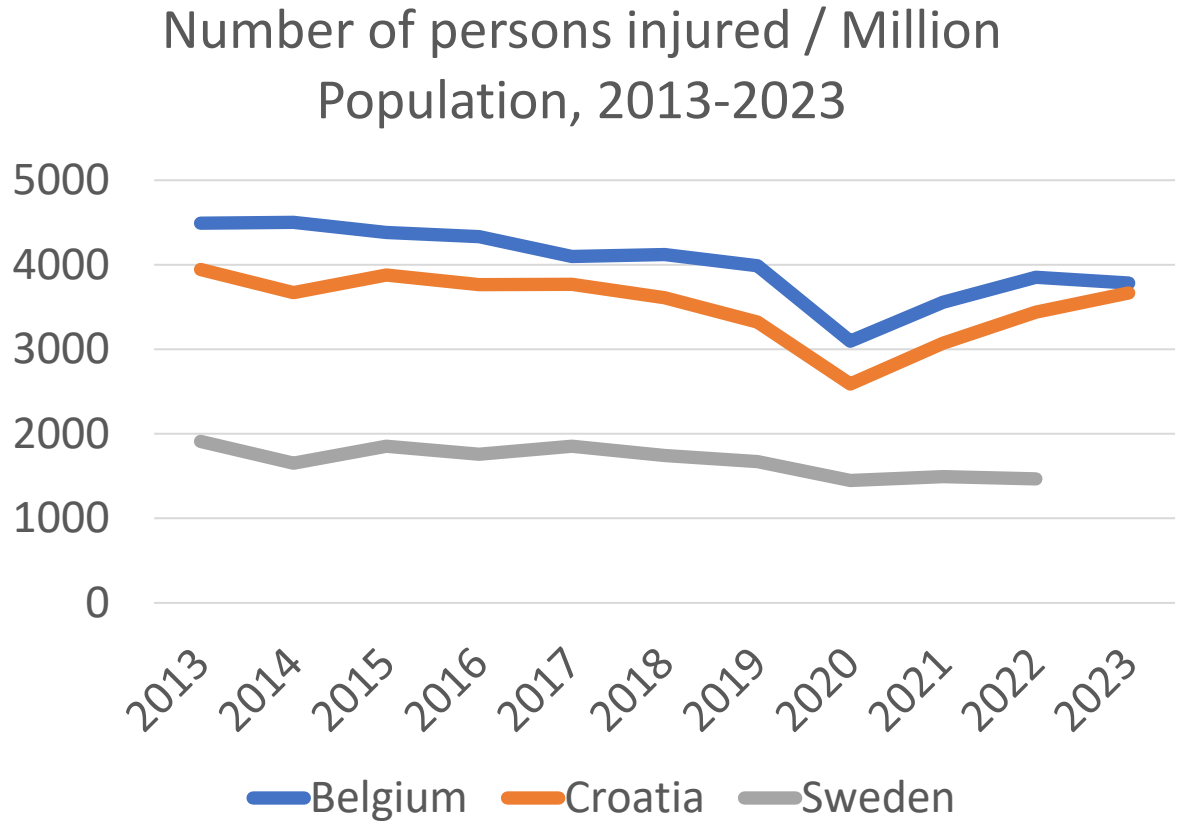

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Killed	Motorways	Inside built-up areas	Outside built-up areas
Belgium	16%	36%	48%
Croatia	14%	55%	31%
Sweden	11%	20%	69%
Injured	Motorways	Inside built-up areas	Outside built-up areas
Belgium	10%	56%	34%
Croatia	6%	76%	18%
Sweden	0%	66%	45%

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Persons injured in road traffic accidents by gender

	Female	Male
Belgium	41%	59%
Croatia	42%	58%
Sweden	42%	58%

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Even more numbers

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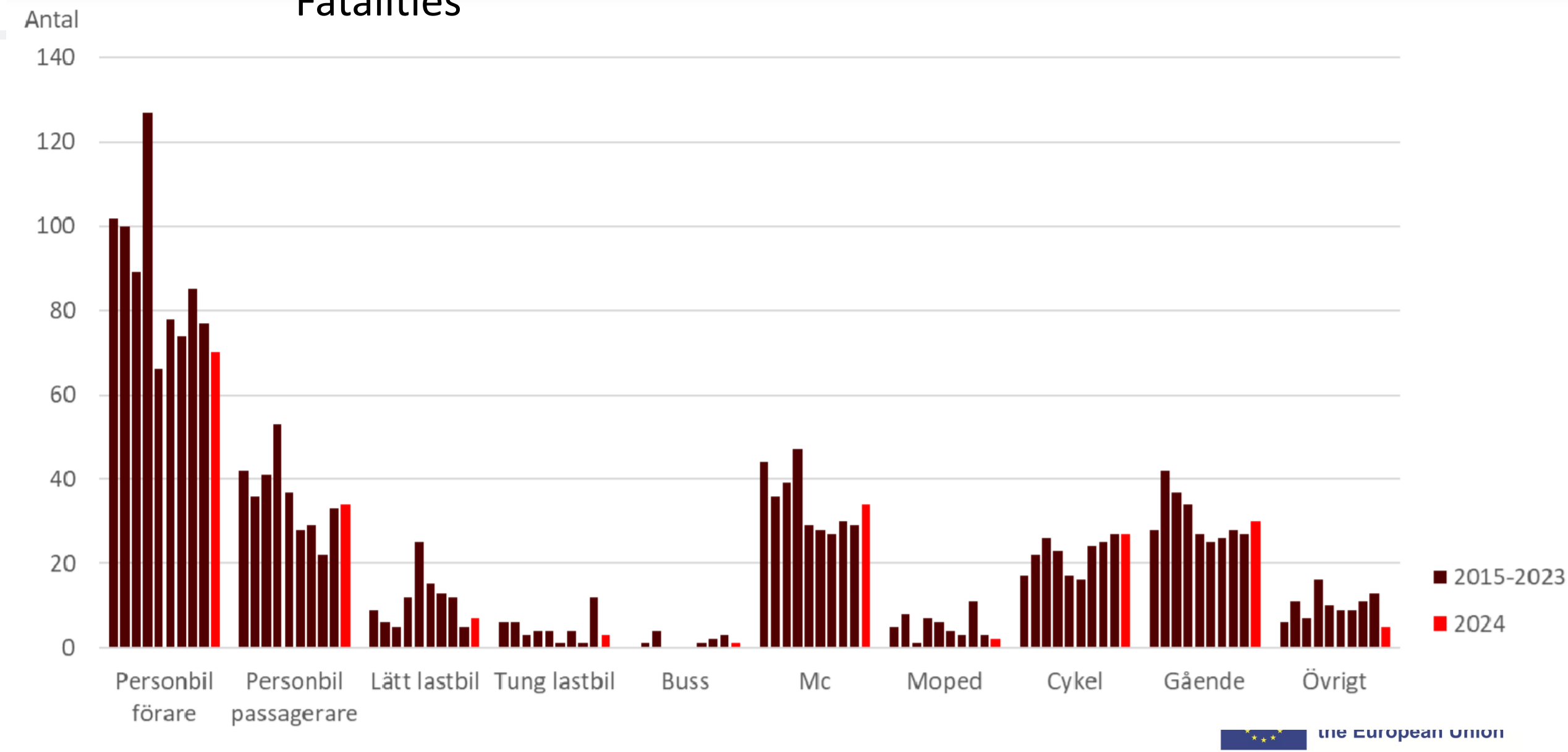
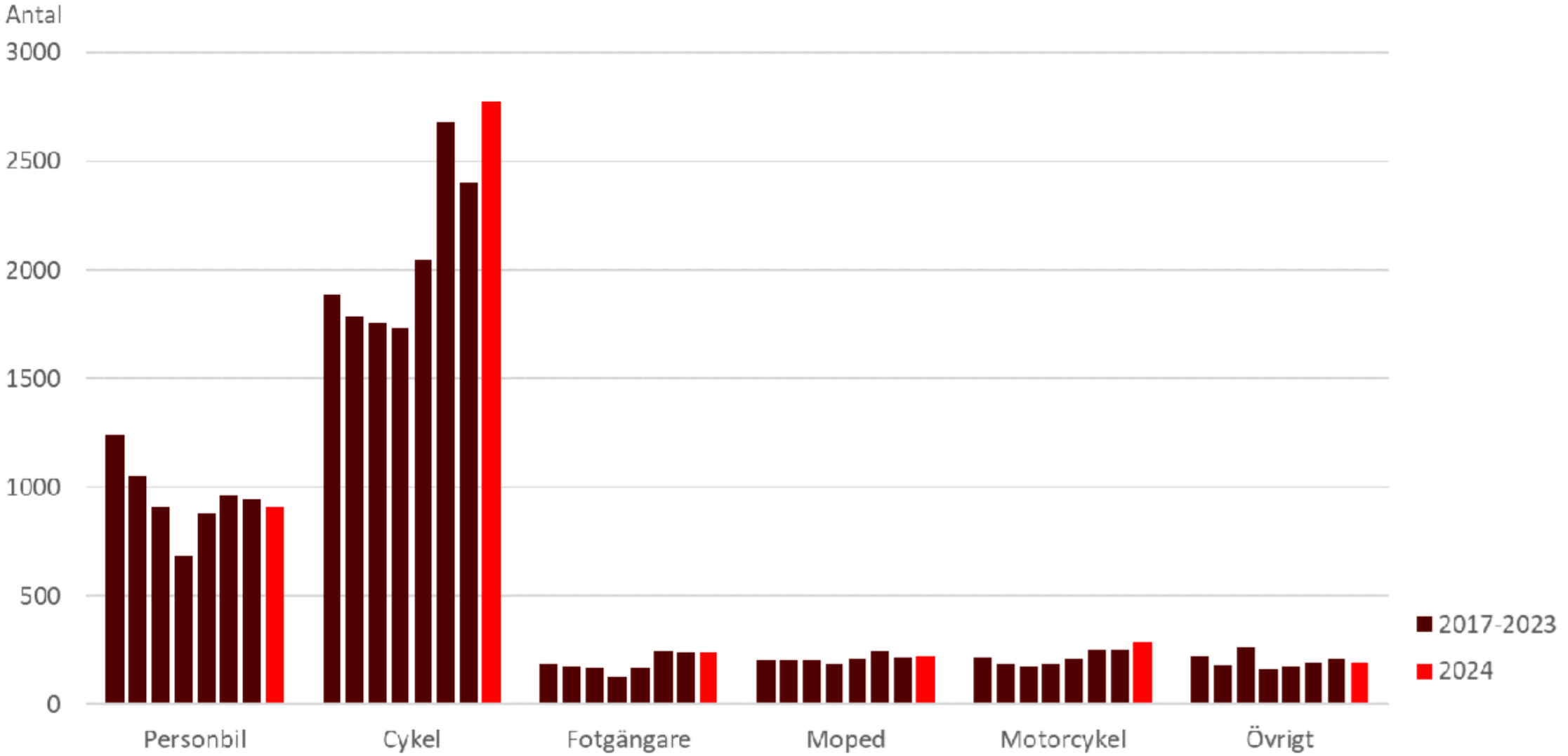
Fatalities



https://trafikverket.diva-portal.org/smash/get/diva2:1953101/FULLTEXT02.pdf

twinsafeSevere injuries



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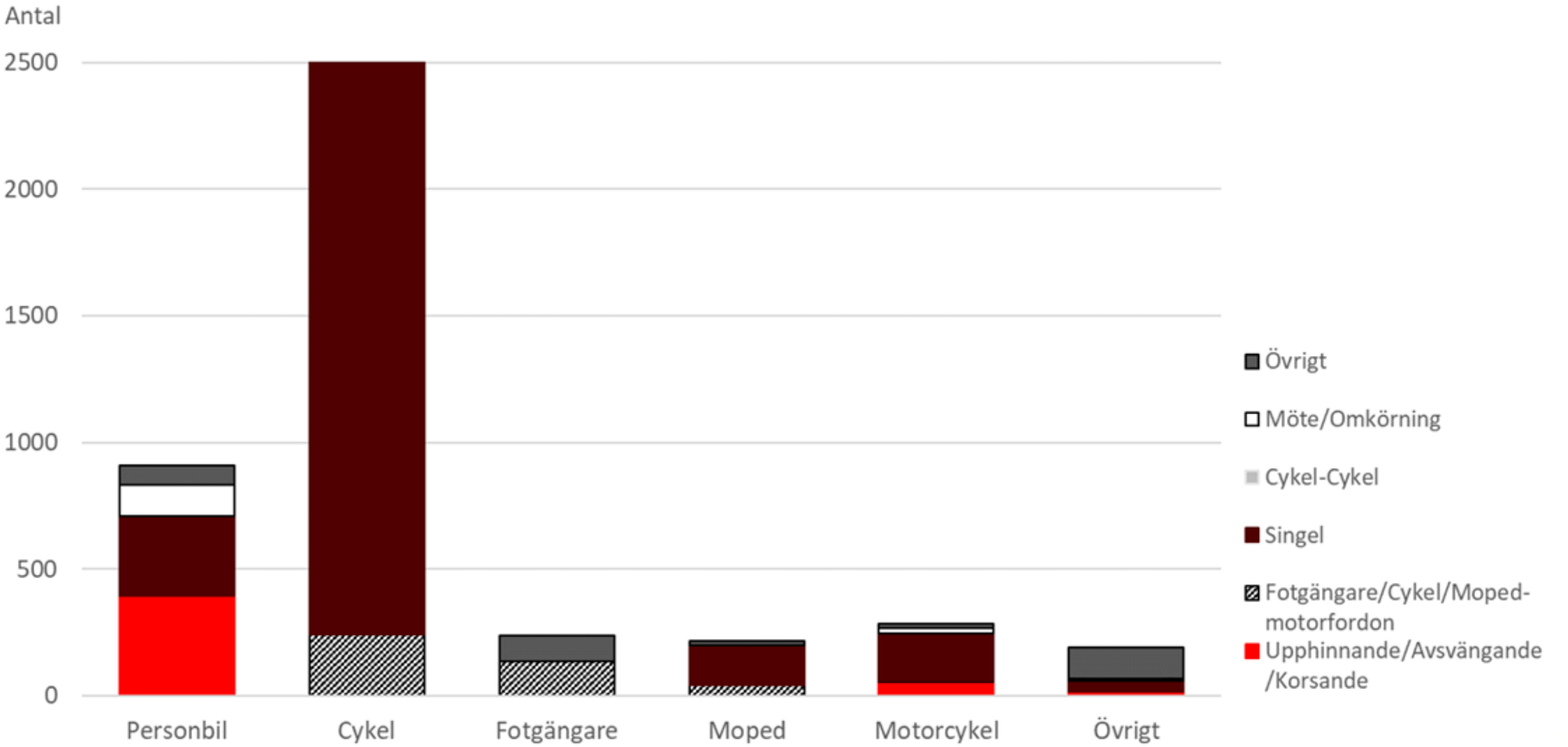
https://trafikverket.diva-portal.org/smash/get/diva2:1953101/FULLTEXT02.pdf



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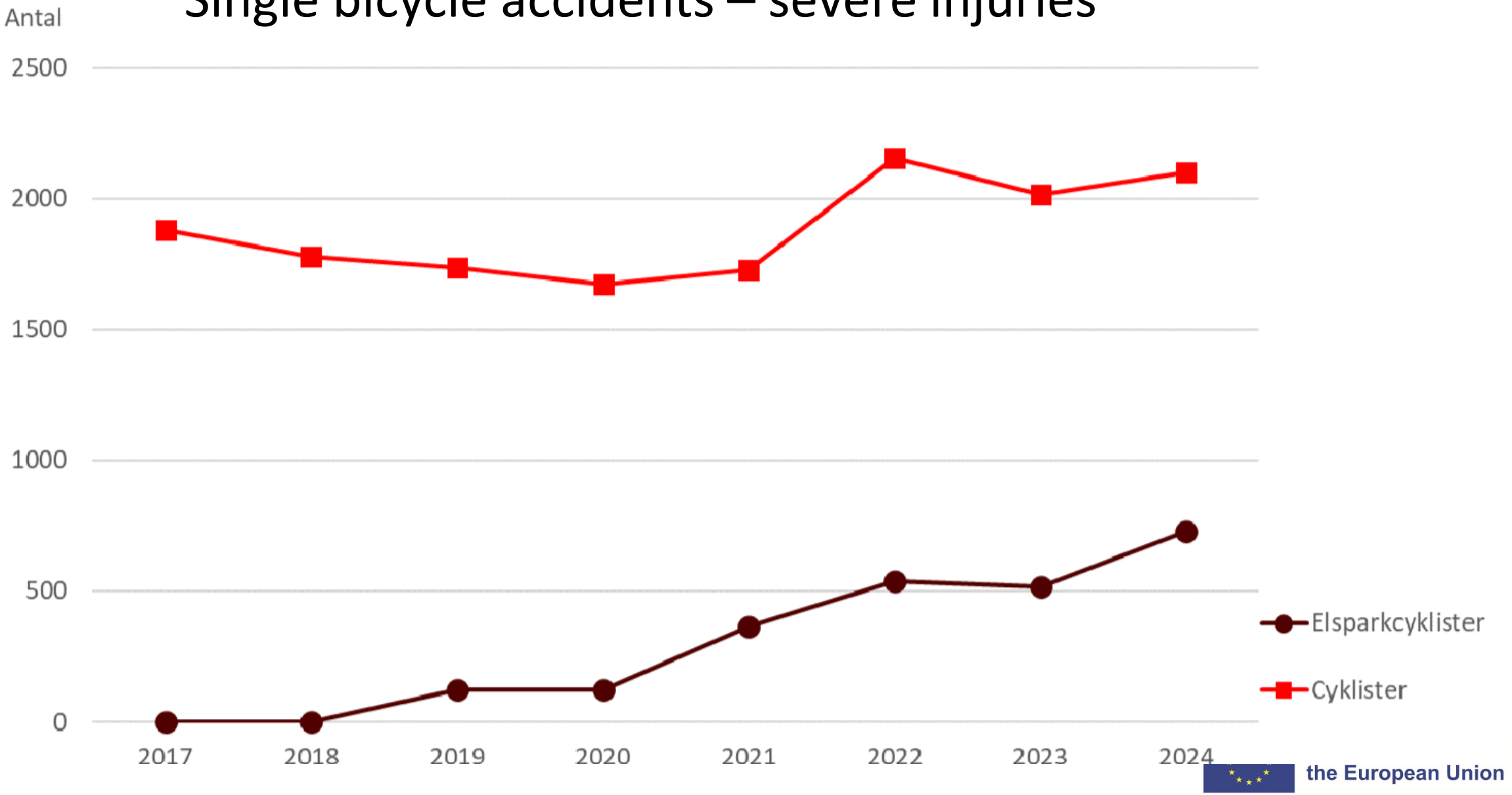
https://trafikverket.diva-portal.org/smash/get/diva2:1953101/FULLTEXT02.pdf

Single bicycle accidents – severe injuries



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https://trafikverket.diva-portal.org/smash/get/diva2:1953101/FULLTEXT02.pdf

1) When talking about “traffic safety”, are you typically talking about cars?

2) Are fall accidents a traffic safety problem?

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Perceived road safety - numbers

https://www.esranet.eu/

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Perceived road safety - numbers

How safe or unsafe do you fell when using the following transport modes?

0 (very unsafe) – 10 (very safe)

	Car Driver	Car Passenger	Public transport	Pedestrian	Moped/ Motorcyclist	Cyclist	E-Scooter rider
Belgium	6,9	6,9	7,1	6,9	5,9	5,8	5,5
Sweden	7,4	7,3	7,4	7,2	6	6,8	5,1

https://www.esranet.eu/

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Perceived road safety - numbers

How would you rate the roads that you regularly use in terms of safety?
Percentage (%) of people that answered safe (5 to 7 och a 1 to 7 scale)

Urban roads

	Car Driver	Moped/ Motorcyclist
Belgium	47%	47%
Sweden	50%	56%

Rural roads

	Car Driver	Moped/ Motorcyclist
Belgium	47%	52%
Sweden	55%	49%

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Perceived road safety - numbers

How would you rate the roads that you regularly use in terms of safety?
Percentage (%) of people that answered safe (5 to 7 och a 1 to 7 scale)

Urban roads **with** sidewalks/cycle lanes

	Pedestrian	Cyclist
Belgium	59%	53%
Sweden	80%	71%

Urban roads **without** sidewalks/cycle lanes

	Pedestrian	Cyclist
Belgium	35%	16%
Sweden	42%	29%

https://www.esranet.eu/

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Perceived road safety - numbers

How would you rate the roads that you regularly use in terms of safety?
Percentage (%) of people that answered safe (5 to 7 och a 1 to 7 scale)

Rural roads **with** sidewalks/cycle lanes

	Pedestrian	Cyclist
Belgium	53%	49%
Sweden	73%	75%

Rural roads **without** sidewalks/cycle lanes

	Pedestrian	Cyclist
Belgium	31%	22%
Sweden	30%	26%

https://www.esranet.eu/

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How safe or unsafe do you fell when using the following transport modes?

0 (very unsafe) – 10 (very safe)

- Car
- Public transport
- Cyclist
- Pedestrian

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Objective and subjective cycling safety

"What do we currently know about the objective–subjective cycling safety relation?"

https://doi.org/10.1080/01441647.2025.2537200

TRANSPORT REVIEWS
2025, VOL. 45, NO. 6, 993–1015
https://doi.org/10.1080/01441647.2025.2537200

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Bridging the gap: a scoping review exploring the relationship between objective and subjective cycling safety

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[a]Department of Technology, Management and Economics, Technical University of Denmark, Kgs. Lyngby, Denmark; [b]Civil Engineering Research and Innovation for Sustainability, Instituto Superior Técnico, Universidade de Lisboa, Lisboa, Portugal; [c]Institute for Systems and Robotics, Instituto Superior Técnico, Universidade de Lisboa, Lisboa, Portugal

ABSTRACT

Research on cycling safety helps create urban environments where cyclists feel and are safe. Cycling safety is studied from two perspectives: objective safety, which examines crashes' causes and consequences, and subjective safety, which explores individuals' perceptions of said crashes. While studying both aspects are important, they are often studied separately. However, understanding their relationship is vital to ensure policies and measures benefit both without unintended negative effects on each. This study reviews literature on the connection between objective and subjective safety. Results show this relationship is complex and context-dependent, with both alignments and discrepancies. Key methodologies, findings, and challenges are discussed to better understand how this relationship can be influenced. The roles of individual behaviour, self-selection, and risk homeostasis in shaping this dynamic are hypothesised and discussed. Overall, the findings highlight the importance of aligning urban planning and safety measures with cyclists' actual and perceived safety. Future research directions are proposed to help authorities and practitioners design interventions that effectively enhance both safety dimensions, ensuring cycling becomes a safer and more appealing mode of transportation.

ARTICLE HISTORY
Received 3 June 2024
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KEYWORDS
Cycling safety; objective safety; subjective safety; objective–subjective safety relation; literature review

1. Introduction

Cycling plays a key role in cities' transition to more sustainable transportation modes as it serves as an important option for shorter trips, including first-and-last-mile links to transit. For those who cycle or intend to do so, cycling safety aspects are often considered as critical barriers to cycle (Aldred, 2016; Aziz et al., 2018;

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Objective and subjective cycling safety

” The results present a complex picture: while some studies suggest a direct link, others indicate context-dependent connections or independence between the two safety types. “

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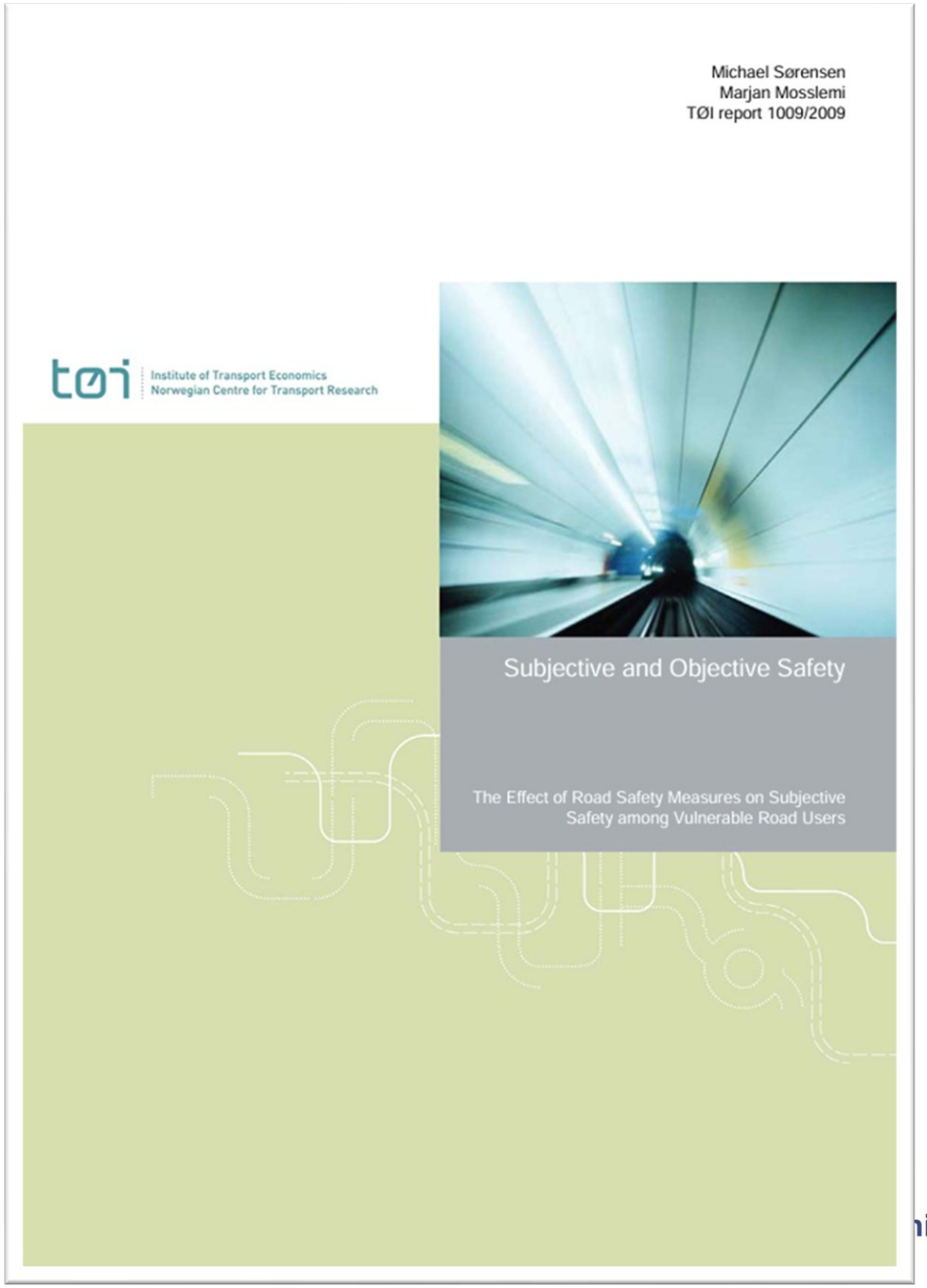
Measures – effect on Subjective and Objective Safety for vulnerable road users



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Subjective and Objective Safety among vulnerable road users

	Measures	Objective	Subjective	Category
1a	Tracks for cycling	(↓)		2a
	Tracks for walking	↑		1a
1b	Pavement	↑	↑	1a
1c	Cycle lanes	(↑)		1a
1d	Cycle lanes in intersections	↑		1a
2	Motorways	(↑)	(↑)	1a
3	Bypasses	↑	↑	1a
4	New arterial roads	(↑)	↑	1a
5a	T-junctions, full channelisation	↓		2a
5b	Crossroads, full channelisation	↑		1a
5c	T-junctions, minor road channelisation	↓		2a
5d	Crossroads, minor road channelisation	↑	↑	1a
5e	T-junctions, physical left-turn lane	↑		1a
5f	Crossroads, physical left-turn lane	(↑)		1a
5g	T-junctions, physical right-turn lane	(↑)		1a
5h	Crossroads, physical left-turn lane	↑		1a
6a	Roundabouts, mixed traffic	↑	↓	1b
6b	Roundabout, separate cycle track	↑	↑	1a
7a	Redesigning, change angles	↕		3b
7b	Redesigning, gradient on road	↑	↓	1b
7c	Redesigning, sight condition	(↑)		1b
8	Staggered junctions	↑	↑	1a
9	Interchanges (instead of crossroad)	↑	↓	1b
10	Black spot treatment	↑	↕	1c
11a	Number of lanes	↕	↓	3b
11b	Lane width	↕	↕	3c
11c	Shoulder width	↕	↑	3a
11d	Passing lanes (one side)	↑	(↓)	1b
11e	Constructing of hard shoulders	(↑)	↑	1a
11f	Hard shoulders, width (+ 0.3 m)	↑	↑	1a
11g	Lanes and shoulder width	(↑)	↑	1a
11h	Central reservations, urban areas	↑	(↑)	1a
11i	Width of bridges	↑	↕	1c
12	Roadside treatment, distance to obstacles	↑	↕	1c
13a	Road alignment, general improvement	↑		1b
13b	Sight conditions, improving	↓	(↓)	2b
13c	Sight conditions, removing obstacles	↑		1b
14	Rehabilitation, reconstruction and resurfacing	(↑)	(↕)	1c
15a	Guardrails alone roadside, new	↑	↑	1a
15b	Crash cushions	↑		1a
16a	Curve treatments, signs	↑		1a
16b	Curve treatments, recommended speed	↑	(↑)	1a
16c	Curve treatments, Road widening	↓		2a
16d	Curve treatments, transition curves	↓		2a
17	Road lighting	↑	↑	1a

TØI report 1009/2009

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Subjective and Objective Safety among vulnerable road users

	Measures	Objective	Subjective	Category
1	Ordinary resurfacing of roads	(↓)	↑	2a
2	Improving the evenness of the surface	↓	↑	2a
3	Improving road surface friction	↑	↑	1a
4	Winter maintenance of roads, general	↑	↑	1a
5	Winter maintenance of tracks, more	↓	↑	2a

TØI report 1009/2009

	Measures	Objective	Subjective	Category
1	Area-wide traffic calming	↑	↑	1a
2	Environmental streets	↑	↑	1a
3	Pedestrian streets	↑	↑	1a
4	Urban play streets	↑	↑	1a
5	Access control	↑	↑	1a
6	Priority control	(↓)	-	2c
7	Yield signs at intersections	(↑)	↓	1b
8	Stop signs at intersections	↑	↓	1b
9a	Traffic signal control, new	↑		1a
9b	Traffic signal control, upgrading	↕	↑	3a
9c	Traffic signal control, separate phases, pedestrians	↑		1a
10	Signal-controlled midblock pedestrian crossings	↑	↑	1a
11	Speed limits, all reductions	↑	↑	1a
12a	Speed-reducing, humps	↑		1a
12b	Speed-reducing, raised intersections	(↓)	↑	2a
12c	Speed-reducing, rumble strips	↑		1a
12d	Speed-reducing, speed zones	↑		1a
13a	Normal edge line	(↑)		1a
13b	Wide edge line	(↓)		2a
13c	Shoulder rumble line	(↓)		2a
13d	Raised pavement markers	(↑)	↑	1a
13e	Delineator posts with reflectors	(↓)		2a
13f	Edge line and centre line	↑		1a
13g	Edge line, centre line, delineator	↑		1a
14a	Ordinary pedestrian crossing	↓	↑	2a
14b	Signal-controlled midblock pedestrian crossings,	↑		1a
14c	Pedestrian crossings, mixed phases, intersection	(↓)	↑	2a
14d	Pedestrian crossings, separate phases, intersection	↑		1a
14e	Raised pedestrian crossings	↑	↑	1a
14f	Refuges on pedestrian crossings	↑	↑	1a
14g	Pedestrian guard rails	↑	↑	1a
14h	School crossing patrols	↑	↑	1a
14i	Pavement widening, intersection	(↑)	↑	1a
14j	Advanced stop lines, intersection	↑	(↑)	1a
14k	Cycle lanes, intersection	↑		1a
14l	Cycle lanes	↑	↑	1a
15	Parking regulations	↑	(↑)	1a
16	One-way streets	(↓)	↑	2a
17	Bus lanes and bus stop design	(↓)	↓	2b

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Subjective and Objective Safety among vulnerable road users

	Measures	Objective	Subjective	Category
1a	Pedestrian reflectors	↑	(↑)	1a
1b	Retro-reflective materials, cycles	↑ (?)		1a
2	Cycle helmets, mandatory wearing	↑ (?)	↑	1a
3	Regulating vehicle mass	↑ (?)	(↕)	1c
4a	Regulating car engine effect	↑ (?)	↑	1a
4b	Regulating top speed	↑		1a
5	Under-run guard rails on lorries	↑	-	1c
6a	Total weight of lorries, decreasing	↑	(↑)	1a
6b	Total length of lorries, decreasing	(↑)		1a
6c	Extra mirrors on lorries	↑		1a
6d	Side marker lamps on lorries	(↑)		1a
7a	Cycle equipment, pedal reflectors	↑	(↑)	1a
7b	Cycle equipment, Spokes reflectors	(↓)		2a
7c	Cycle equipment, ankle light	↑		1a
7d	Cycle equipment, jacket reflectors	↑		1a
7e	Cycle equipment, taillight	↑		1a
7f	Cycle equipment, brakes	↑		1a
7g	Cycle equipment, brake blocks	(↕)		3a
7h	Cycle equipment, normal handlebars	↑		1a
7i	Cycle equipment, normal wheel	↑		1a
7j	Cycle equipment, distance markers	(↑)		1a
8a	Ban on driving with trailers	-	(↑)	3a
8b	Special speed limits for lorries	-		3a
8c	Total weight limits for trailers	-		3a
8d	Better stability, control and tracking for trailers	-		3a

TØI report 1009/2009

	Measures	Objective	Subjective	Category
1a	School transport with buses	↑	(↑) ?	1a
1b	Safety standards for school buses	↑		1a
1c	Improving bus stops	-		3a
1d	Training bus drivers	-		3a
2	Education of pre-school children	-	↑	3a
3a	School education, crossing a road	↑	↑	1a
3b	School education, Cycling	(↑)		1a
4	Stationary speed enforcement	(↑)	↑	1a
5	Patrolling	↑	↑	1a
6	Automatic speed enforcement	↑	↑	1a
7	Red light cameras	↑	(↑)	1a

TØI report 1009/2009

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Table 6.14. Measures with opposite effect on objective and subjective safety.

Positive effect on subjective safety and negative effect on objective safety	Positive effect on objective safety and negative effect on subjective safety
– Tracks for cycling	– Roundabouts, mixed traffic
– T-junctions, full channelisation	– Redesigning, gradient on road
– T-junctions, minor road channelisation	– Redesigning, sight condition
– Curve treatments, road widening	– Interchanges (instead of crossroad)
– Curve treatments, transition curves	– Passing lanes (one side)
– Ordinary resurfacing of roads	– Road alignment, general improvement
– Improving the evenness of the surface	– Sight conditions, removing obstacles
– Winter maintenance of tracks, more	– Yield signs at intersections
– Speed-reducing, raised intersections	– Stop signs at intersections
– Wide edge line	
– Shoulder rumble line	
– Delineator posts with reflectors	
– Ordinary pedestrian crossing	
– Pedestrian crossings, mixed phases, intersection	
– One-way streets	
– Cycle equipment, spokes reflectors	

TØI report 1009/2009

- When making changes to the infrastructure, should both objective and subjective safety be considered?

- In what kind of situations might we focus on only one of these aspects of road safety?

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Biking and subjective safety

Barriers and enablers for riding a bike for transport

TRANSPORT REVIEWS
2023, VOL. 43, NO. 3, 356–384
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Routledge
Taylor & Francis Group

RESEARCH ARTICLE

Check for updates

Adults' self-reported barriers and enablers to riding a bike for transport: a systematic review

Lauren Pearson [a], Danielle Berkovic [a], Sandy Reeder [a], Belinda Gabbe [a,b] and Ben Beck [a]

[a]Sustainable Mobility and Safety Research, School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia; [b]Health Data Research UK, Swansea University, Swansea, UK

ABSTRACT

Riding a bike for transport purposes is an effective way to improve population and environmental health. Despite this, participation levels in many countries are low. Identifying the barriers and enablers to riding a bike for transport is essential to developing interventions that encourage bike riding. In this mixed-methods systematic review, we aimed to identify the perceived barriers and enablers to adults riding a bike for transport in Organisation for Economic Development (OECD) countries. A systematic database search was conducted to identify relevant peer-reviewed and grey literature. Fourty-five papers/reports met eligibility criteria. There were 34 barriers and 21 enablers identified. The leading barriers related to riding on the road alongside motor vehicles. Other factors identified included the provision and quality of cycling infrastructure, personal factors such as physical fitness, attitudinal factors such as community perceptions of cyclists, and environmental factors. While this review highlights the complexity of factors that influence the uptake of riding a bike for transport, many of the leading factors could be overcome through the provision of high-quality protected infrastructure for bike riders. Other interventions to address other known barriers and enablers are needed to increase the uptake of bike riding.

ARTICLE HISTORY
Received 6 October 2021
Accepted 28 July 2022

KEYWORDS
Active transport; cycling; mobility; mixed-methods; barriers

Introduction

The health benefits of riding a bike are vast and well established, including improved cardiorespiratory fitness, cognitive function and mental wellbeing (Celis-Morales et al., 2017; Leyland et al., 2019; Nordengen et al., 2019). Beyond this, an increase in trips made by bike has the potential to reduce traffic congestion, environmental pollutants, and offer economic benefits to both individuals and governments (Litman, 2015; Pérez et al., 2017; Rabl & De Nazelle, 2012). A large proportion of trips made by car are a distance that could potentially be made by bike (Beck et al., 2021; Department of Transport, 2021; Harper & Fan, 2021; Vagane, 2007), highlighting the potential for increased participation in bike riding for transport, in addition to for recreational purposes.

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on

doi.org/10.1080/01441647.2022.2113570

Barrier
Safety
Fear of motorist aggression
Perceived risk of injury
High traffic density
Feelings of safety
Fear of theft or crime
Infrastructure
Poor quality and condition of dedicated bike lanes
Poor condition of roads
Limited dedicated bike lanes
Darkness
Lack of connectivity of bike paths
Trip factors
Lack of storage on bike
Long distance
Time to destination too great
Children to transport
Personal factors
Having to change or shower at destination
Too much effort
Lack of fitness
Not interested
Unable to ride a bike due to injury or disability
Lack of knowledge of bike riding road rules and bike maintenance
Do not own suitable clothing
Lack of comfort
Access
No bike
Cost of bike too high
Mandatory helmet laws
Environmental factors
Bad weather
Air-pollution exposure
Too many hills
End of trip facilities
Lack of showers or lockers
Lack of bike parking
Perceptions
Negative community perception of cyclists
Negative perception of e-bikes from pedal cyclists

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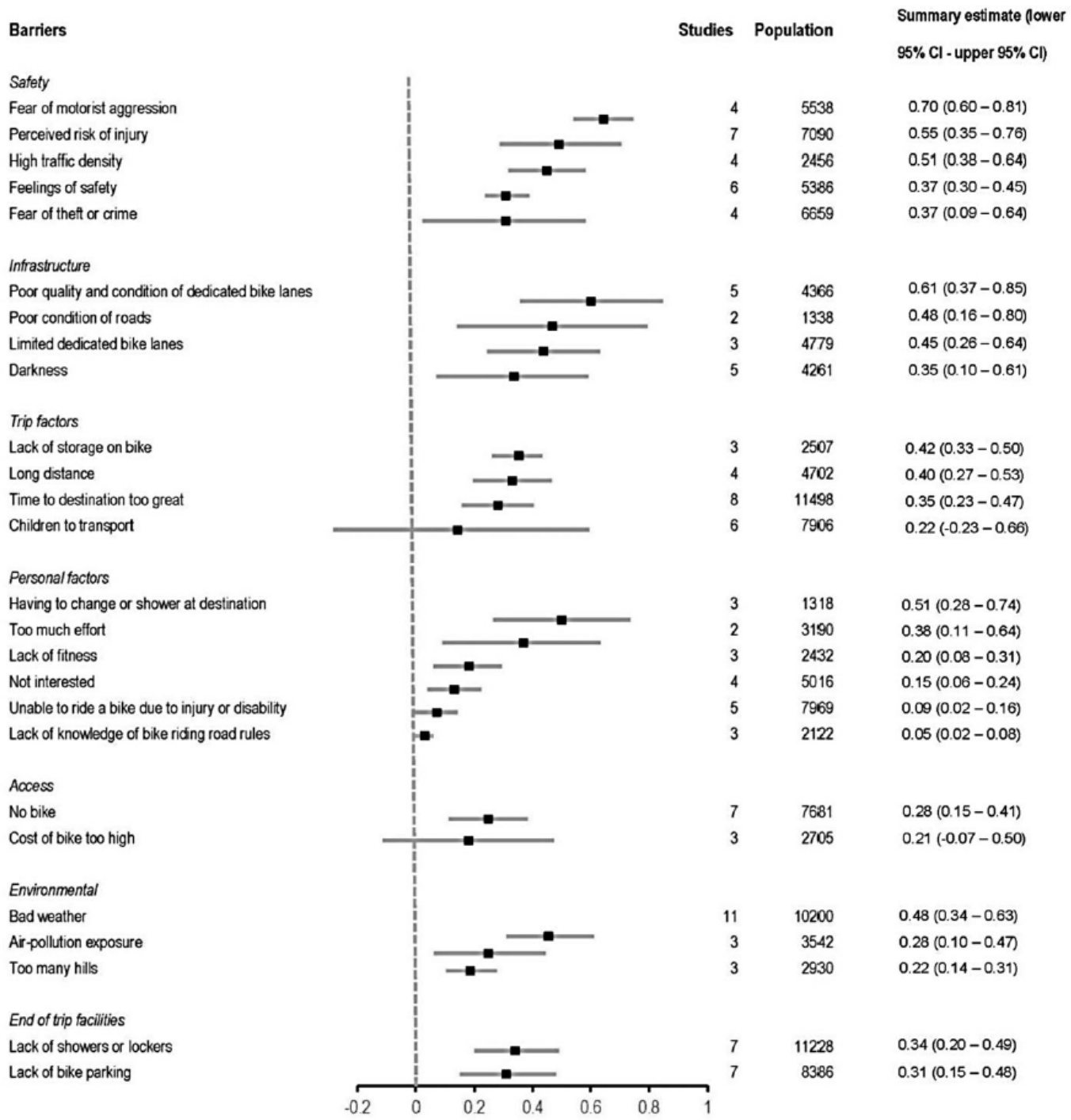
Barriers



Barriers	Studies	Population	Summary estimate (lower 95% CI - upper 95% CI)
Safety			
Fear of motorist aggression	4	5538	0.70 (0.60 – 0.81)
Perceived risk of injury	7	7090	0.55 (0.35 – 0.76)
High traffic density	4	2456	0.51 (0.38 – 0.64)
Feelings of safety	6	5386	0.37 (0.30 – 0.45)
Fear of theft or crime	4	6659	0.37 (0.09 – 0.64)
Infrastructure			
Poor quality and condition of dedicated bike lanes	5	4366	0.61 (0.37 – 0.85)
Poor condition of roads	2	1338	0.48 (0.16 – 0.80)
Limited dedicated bike lanes	3	4779	0.45 (0.26 – 0.64)
Darkness	5	4261	0.35 (0.10 – 0.61)
Trip factors			
Lack of storage on bike	3	2507	0.42 (0.33 – 0.50)
Long distance	4	4702	0.40 (0.27 – 0.53)
Time to destination too great	8	11498	0.35 (0.23 – 0.47)
Children to transport	6	7906	0.22 (-0.23 – 0.66)
Personal factors			
Having to change or shower at destination	3	1318	0.51 (0.28 – 0.74)
Too much effort	2	3190	0.38 (0.11 – 0.64)
Lack of fitness	3	2432	0.20 (0.08 – 0.31)
Not interested	4	5016	0.15 (0.06 – 0.24)
Unable to ride a bike due to injury or disability	5	7969	0.09 (0.02 – 0.16)
Lack of knowledge of bike riding road rules	3	2122	0.05 (0.02 – 0.08)
Access			
No bike	7	7681	0.28 (0.15 – 0.41)
Cost of bike too high	3	2705	0.21 (-0.07 – 0.50)
Environmental			
Bad weather	11	10200	0.48 (0.34 – 0.63)
Air-pollution exposure	3	3542	0.28 (0.10 – 0.47)
Too many hills	3	2930	0.22 (0.14 – 0.31)
End of trip facilities			
Lack of showers or lockers	7	11228	0.34 (0.20 – 0.49)
Lack of bike parking	7	8386	0.31 (0.15 – 0.48)

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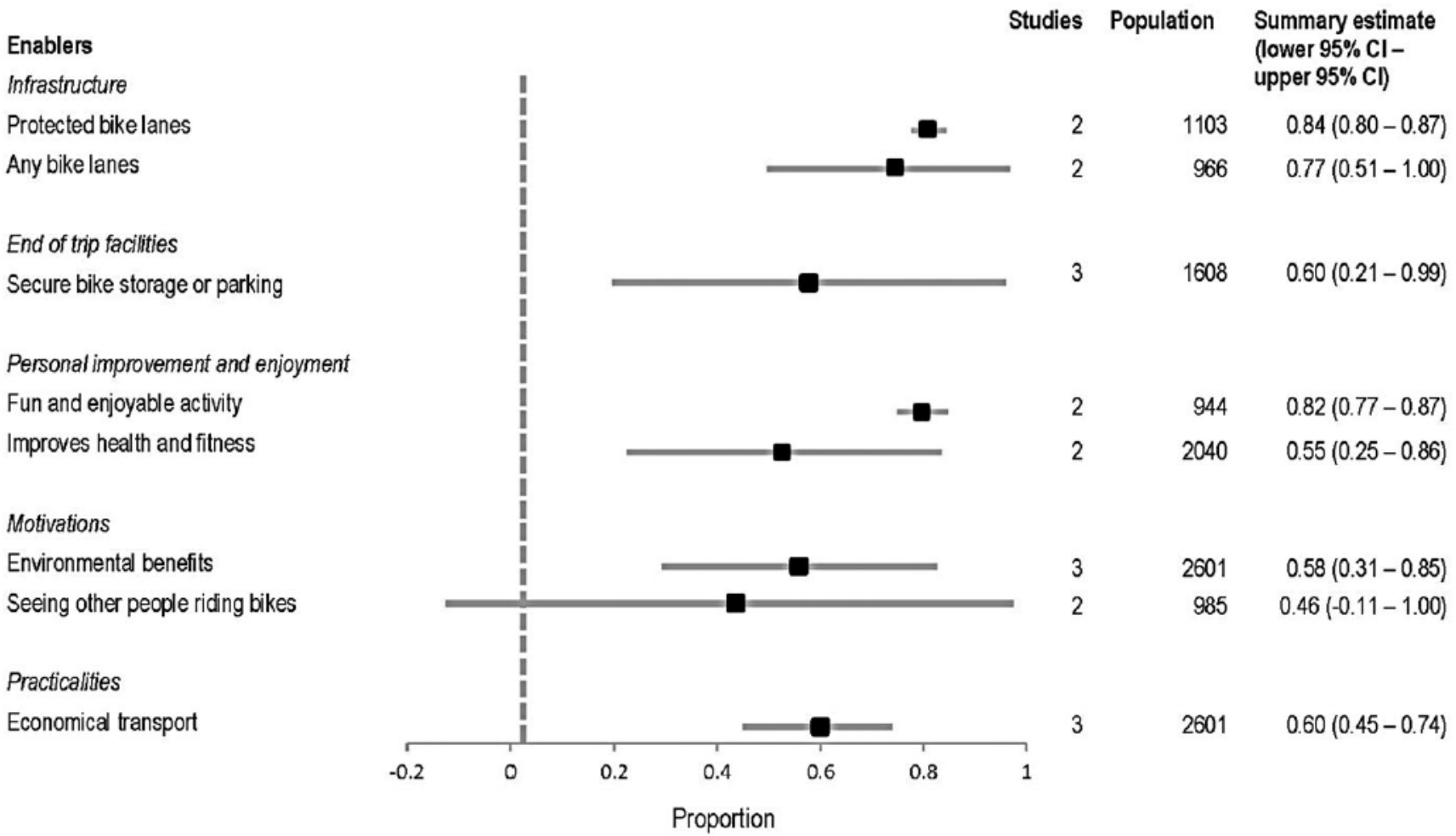
Enablers



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- Regarding specifically safety, how should bicycling be encouraged?

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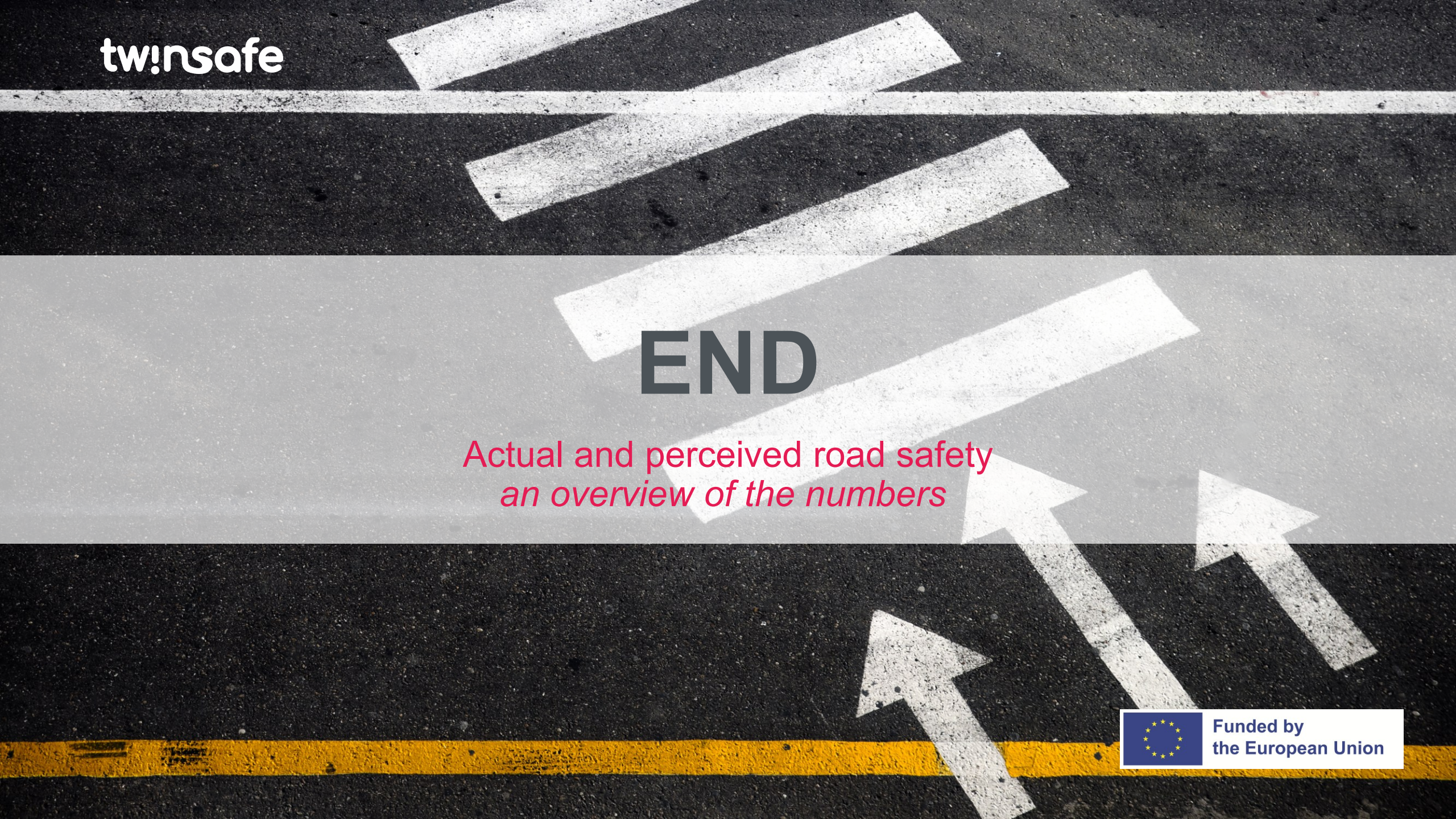
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END
Actual and perceived road safety
an overview of the numbers
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Adults' self-reported barriers and enablers to riding a bike for transport: a systematic review

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Bridging the gap: a scoping review exploring the relationship between objective and subjective cycling safety

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Subjective and objective safety - the effect of road safety measures on subjective safety among vulnerable road users

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Differences between user groups (here gender) and how can they be considered

Lena Winslott Hiselius, Lund university

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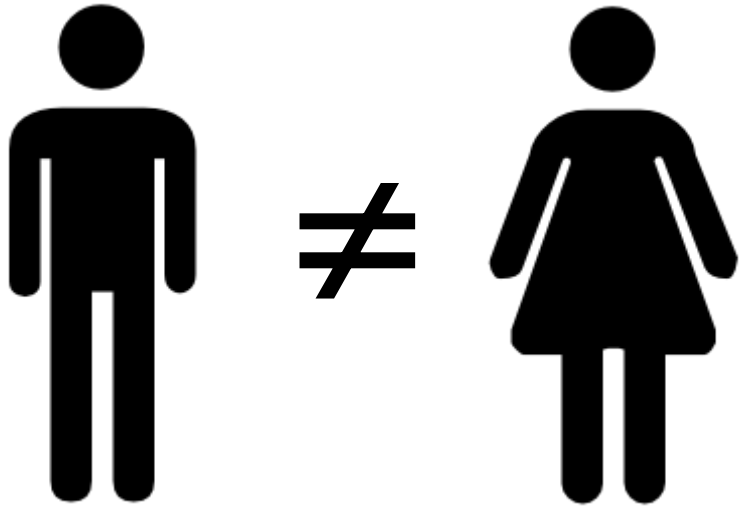
Gender equality is not to behave the same!



But to have the same power
(opportunities, rights and obligations)
to influence society and one's own life

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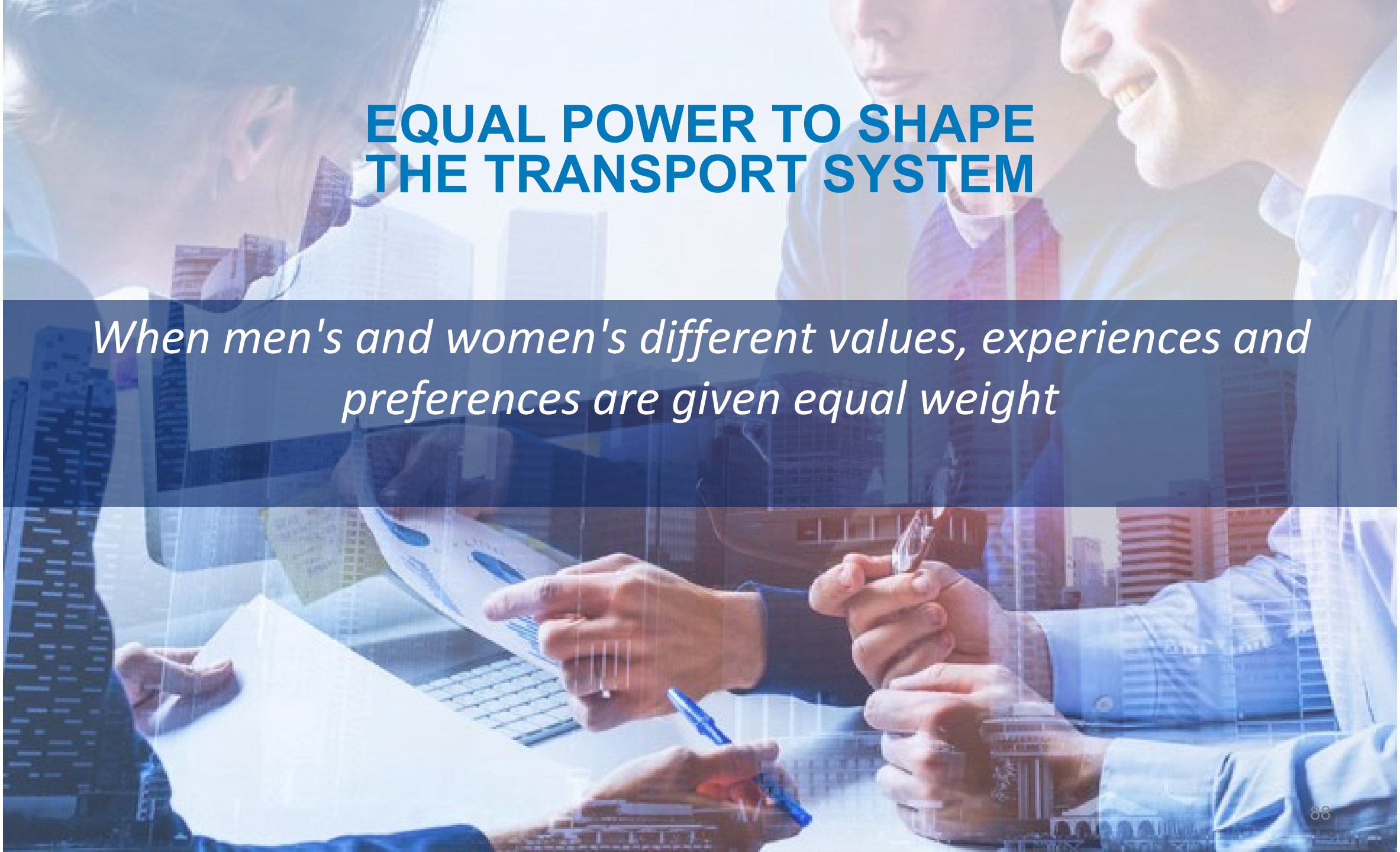

EQUAL POWER TO SHAPE THE TRANSPORT SYSTEM

When men's and women's different values, experiences and preferences are given equal weight

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Example from Umeå (9 min)

- How did Umeå become a model city for women?

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Question

- Is the a “default user” of a transport system seen from your perspective of research?

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Differences in Travel behaviour

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Gender Differences in Travel behaviour

Men and women do about the same number of trips per day in Sweden (2.4 in trad Travel Survey)

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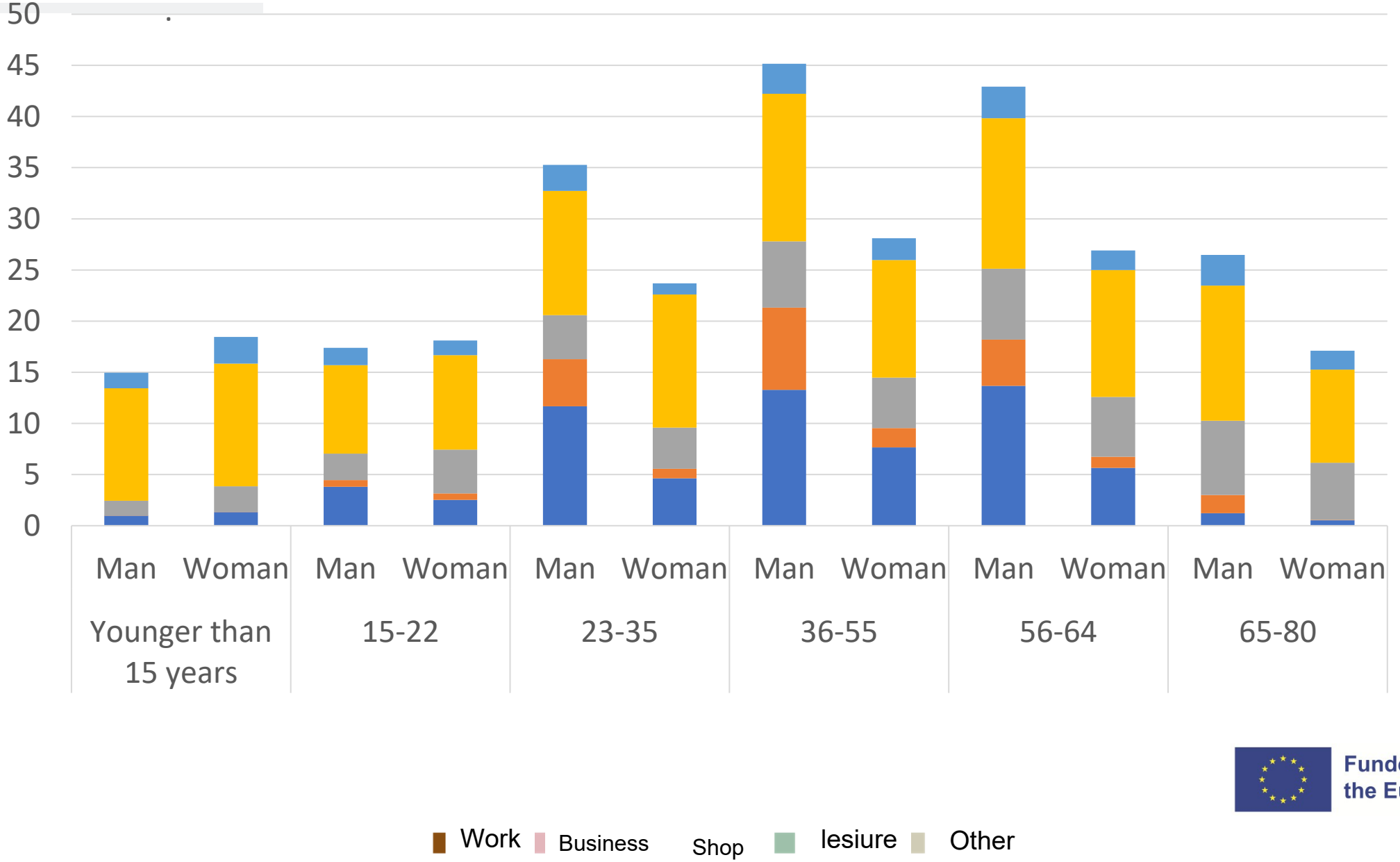
Kilometers by car and errand per person and day in Sweden (2021)



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Gender Differences in Travel behaviour

- Men do more kilometres by car
- Women generally have shorter, more complex and multimodal route chains.
- Women are often not travelling alone but accompany children och people in need of care.

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Implications - The “default user”

Historically transport systems have been studied (and planned) around:

- A full-time worker
- Traveling peak-hour, home–work
- Often implicitly male and travelling by car

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Implications - The “default user”

Historically transport systems have been studied (and planned) around:

- A full-time worker
- Traveling peak-hour, home–work
- Often implicitly male and travelling by car

👉 This leads to:

Underestimation of complex trip patterns

Less attention to data collection on walking, biking, PT

Less attention to local accessibility

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Utilisation of new technology and mobility offers

- Women are very much in minority when it comes to using new mobility services and offers, e.g. chaired bikes, e-scooters etc.

- Men adopt Electric Vehicles earlier and more frequently
- Women show lower familiarity, confidence, and purchase intention also when studying stages after early adopters

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Implications of actions

Differences in travel patterns means that the transport system might benefit men and women differently.

- If actions to improve infrastructures for car, then men will benefit more than women from these actions as men more often drive cars.
- If bus lines are planned to serve people going from home directly to work, then they will not meet women's multipurpose trips.
- New technologies benefit men more than women.

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Differences in Traffic safety

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Safety norms and perceptions

- People have different levels of need for safety and security.
- Many women feel insecure when travelling alone. The causes, effects and successful countermeasures are still relatively unexplored.
- Only a fraction of all sexual harassment and assaults are recorder or presented in statistics. Worldwide 80 to 90% of women say they have been harassed on public transport.

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Safety norms and perceptions – adjustments in Travel behaviour

Feeling of being unsecure creates "*hidden constraints*" on mobility:

- Choosing longer but safer routes
- Avoidance of certain routes, times, or modes
- Avoiding night travel
- Reduced access to opportunities

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Added information breaking down statistics on mode

	Dead		Serious injury		Light injury	
	Men	**Women**	**Men**	**Women**	**Men**	**Women**
Total	73%	27%	64%	35%	58%	42%
Car drivers	71%	29%	65%	35%	59%	41%
Car passengers	42%	58%	47%	52%	42%	57%
Motorcycle	97%	3%	91%	8%	92%	8%
Moped	100%	0%	73%	27%	64%	36%
Bicycle	81%	19%	62%	37%	56%	44%
Walking	73%	27%	46%	52%	45%	55%

Statistics Sweden 2024

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Implications: Safety norms and perceptions of safety

Traditional transport planning has often:

- Focused on traffic safety (crashes)
- Paid less attention to perceived safety and comfort

👉 This reflects a norm that prioritizes risks more typical for male users (accidents) over those more frequently experienced by women (harassment, insecurity). Less focus on light injuries and modes like walking and biking.

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Implications: Safety norms and perceptions of safety

- Focus on observed travel behaviour

👉Not considering influence on travel pattern (adjusting, avoiding) - disregarding the observed travel behaviour is not the preferred one

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Differences in Data collection

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Data and modelling biases

Transport models often rely on:

- Aggregate flows
- Commuting patterns

👉 These can miss gendered travel behaviors, reinforcing norms that:

- Value efficiency over everyday accessibility
- Prioritize major flows over diverse needs

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Differences in Data collection

- Women are often underrepresented in samples of study participants. The resulting data is seen as neutral, but in reality often reflects the male perspective.
- First female crash test dummy introduced 2023…
- This pattern continuous when it comes to technologies such as AI. They are embedded in social structures and may therefore reflect inequalities.

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Questions

- What diversity categories might be interesting to keep an eye on in your work?
- How can you reach these people and gain access to their experiences?

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Differences in norms and values

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Norms and values

Values = what people consider important (abstract principles)

Norms = refer to the shared rules, expectations, standards, and practices that guide how transport systems are planned, operated, and used. (Informal and formal)

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Key norm differences shaping the transport system

Area	Dominant traditional norm	Gender-sensitive perspective
Travel purpose	Work commuting focus	Care, errands, multi-purpose trips
Mode priority	Cars	Public, walking, cycling
Safety	Crash prevention	Personal security + comfort
Planning unit	Trip efficiency	Accessibility and daily life
User model	“Average commuter”	Diverse users with different need

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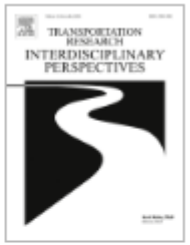
ELSEVIER

Transportation Research Interdisciplinary Perspectives

Volume 8, November 2020, 100236



Are women greener than men? A preference analysis of women and men from major German cities over sustainable urban mobility

Ines Kawgan-Kagan ✉

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Women are generally more positive about:

- Lower speeds
- Strictness towards cars
- Investments in walking and cycling
- Public transport

E.g. Kronsell, et al (2024) Gendered mobilities, transport norms and the potential for sustainable climate transitions in *Handbook of Gender and Mobilities.*

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The transport area: "male-coded"

- The transport system traditionally upholding masculine norms (focus on investments, new technologies, efficiency (top-down steering, CBA-analysis etc))
- Women lacks representation in the decision-making process

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Questions

What norms are there in the plans for the future transport system?

- Gender neutral?
- Norm neutral?

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BUT - REPRESENTATION (NUMBER OF HEADS) DOES NOT GUARANTEE GENDER EQUALITY

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Gender mainstreaming

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Tools for Gender Mainstreaming

- Gender-disaggregated data
- Gender impact assessments
- Inclusive stakeholder processes
- Gender-aware indicators
- Gender budgeting - gender perspective in allocation of public budgets

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Gender Mainstreaming

Ask systematically:

- Who benefits?
- Who bears the costs?
- Whose needs define the problem?
- Whose knowledge is used?
- Who is excluded?

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Example: Gender mainstreaming in transport planning

Research and design for:

- Safety and visibility (lighting, open spaces)
- Accessibility (short distances, connectivity)
- Inclusivity (strollers, luggage, mobility aids)

Example:

- Redesigning bus routes to support trip chaining
- On-demand stops at night
- Safer station design

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Rethinking inclusive mobility: Lived experiences of persons with disabilities

Prof. dr. An Neven, 16 june, 2026, INSIGHT summers school Zagreb

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Introduction

- Prof. dr. An Neven
  - Bachelor & master in Transportation Sciences
  - PhD (2015) in Transportation Sciences
  - Associate professor at Transportation Research Institute, Hasselt University

- Research interests
  - Sustainable mobility
  - Interventions related to mobility and health
  - Mobility and traffic safety in emerging countries
  - Care mobility, physical activity, assistive technologies
  - Optimization of the accessibility of the transport system
  - Research about (general) travel behaviour and mobility needs/problems
  - Facilitation of autonomous travel behaviour of people with decreased mobility

  - Supervisor of 10 PhD-students (5 graduated)
  - Teaching in Bachelor and Master program of Transportation Sciences

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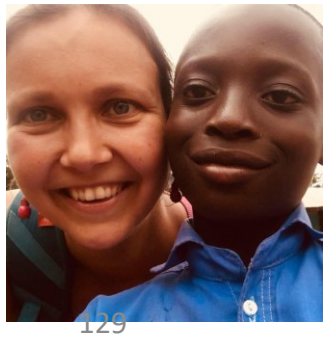
Introduction

- Prof. dr. An Neven
  - Bachelor & master in Transportation Sciences
  - PhD (2015) in Transportation Sciences
  - Associate professor at Transportation Research Institute, Hasselt University

- … & social interests
  - SnoezelFroezel (KVG): organization of activities/weekends for persons with intellectual disabilities
  - Kazou Limburg: head animator for children/adults with disabilities
  - KrisKras: travel guide for sustainable holidays for young-adults in Africa
  - Plan Belgium (foster) parent of Maxwell



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Today's focus

- Inclusive mobility from the perspective of the lived experiences of persons with disabilities
- Mobility as a prerequisite for participation, autonomy and social inclusion
- Everyday barriers and hidden mobility burdens across the transport chain
- Interaction between accessibility, predictability, perceived safety and independent mobility
- Importance of user-centred and participatory approaches
- Rethinking mobility systems beyond purely technical accessibility measures

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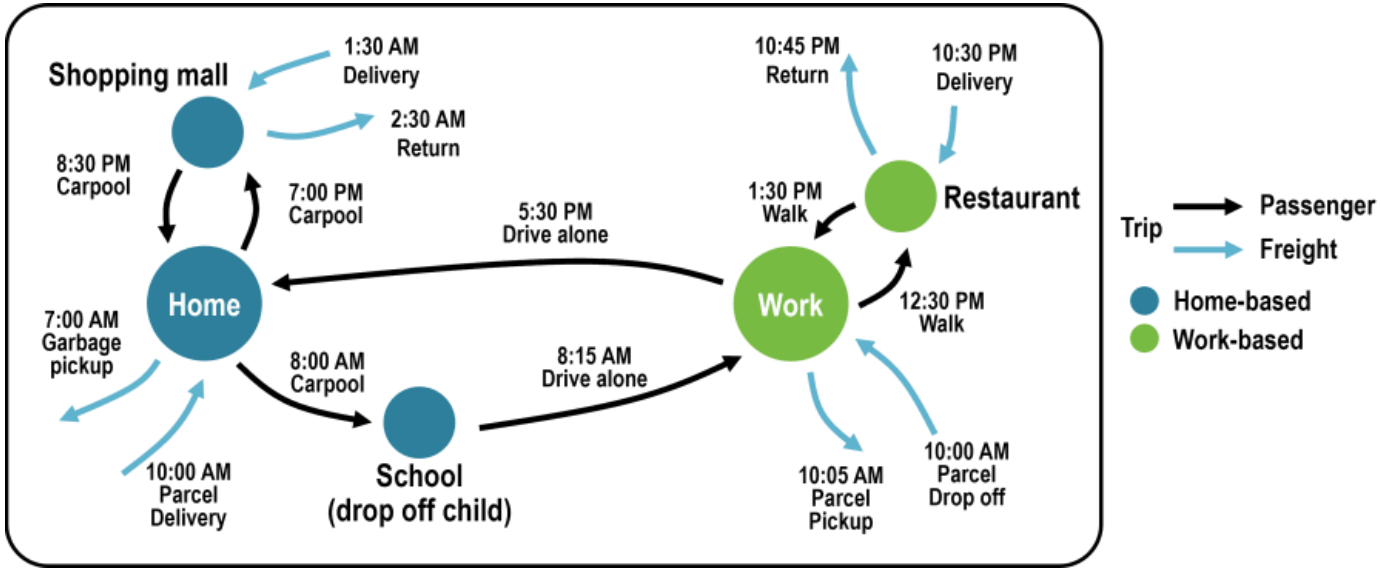
Why mobility matters

- Mobility as a prerequisite for participation
  - Mobility enables access to education, work, healthcare, leisure, social life
  - Mobility as a **derived demand**: want or need to participate in activities
  - When mobility is constrained, participation becomes constrained
  - For persons with disabilities, transport barriers can therefore become participation barriers



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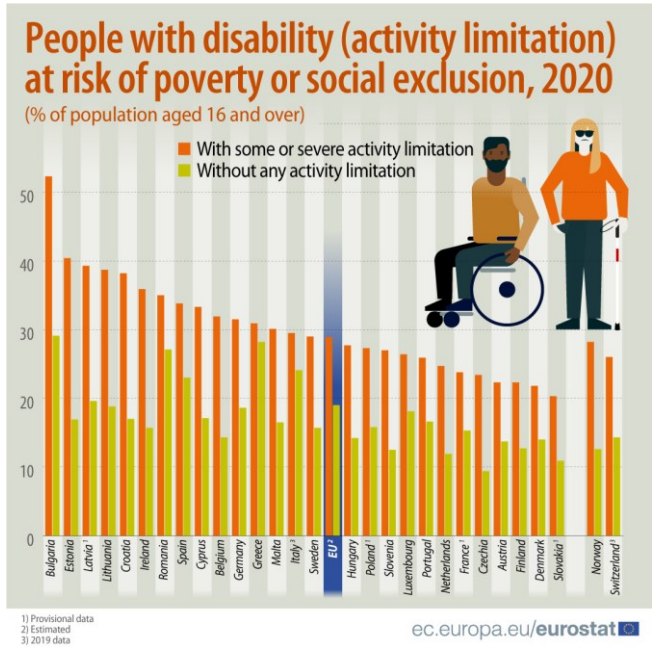
Mobility & social exclusion

- When mobility is limited, opportunities become limited
  - Transport disadvantage can restrict access to key services & opportunities
  - Exclusion is not only about not being able to travel; it is also about having fewer realistic choices
  - A mobility system can therefore reproduce wider social inequalities

- Transport poverty/disadvantage
  - Possible factors: socio-economic, financial, geographic, **disability-related**,…
  - Impact for individual & society
  - Mobility barriers can reinforce social exclusion, especially when combined with poverty, disability, age, limited social support



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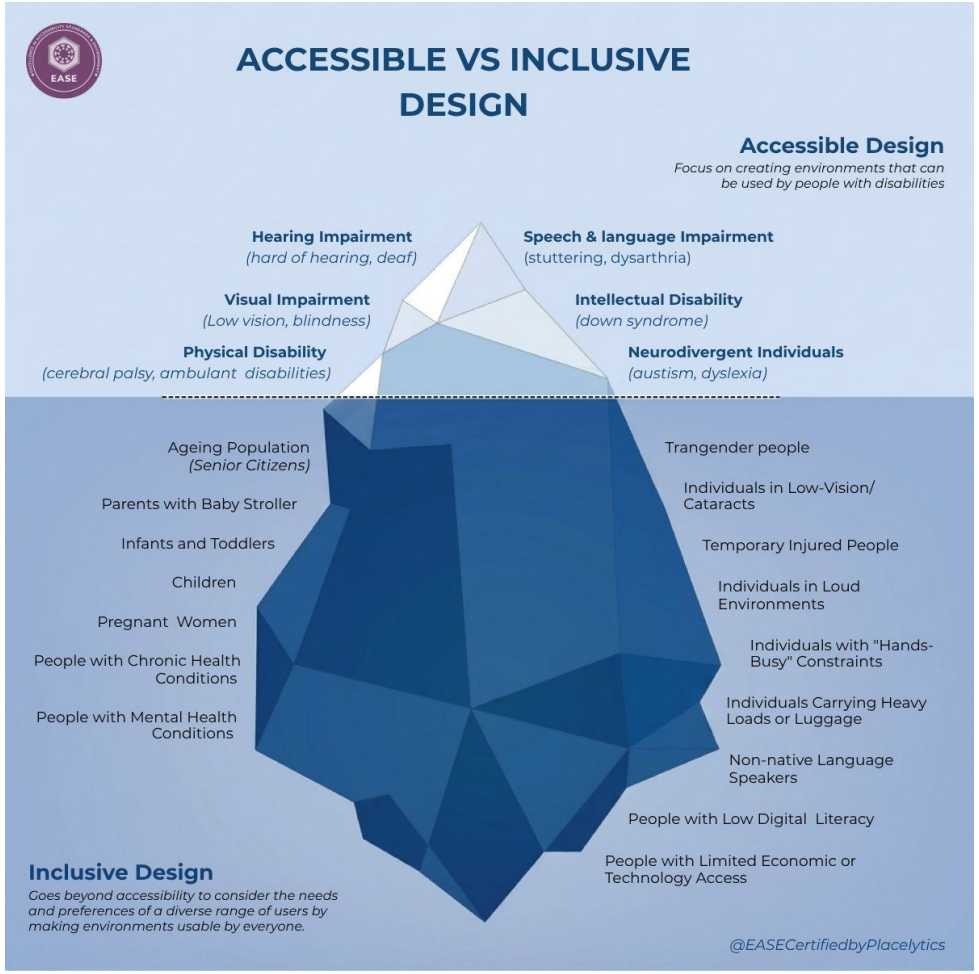
Accessible vs inclusive design

- Accessible design versus inclusive design
  - **Accessible transport**: focus on removing specific barriers for recognised disability groups
  - **Inclusive mobility**: starts from the diversity of real users & real travel contexts
  - Barriers may be physical, cognitive, emotional, organisational, social or digital



- Inclusive design also benefits people with temporary or situational limitations

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From accessibility to inclusion

- Technical accessibility is necessary, but not sufficient

- **Accessible transport** asks:
  - Can users enter the vehicle?
  - Is there a ramp, lift or wheelchair space?
  - Does the infrastructure meet technical requirements?

- **Inclusive mobility** also asks:
  - Can users travel independently?
  - Can they travel spontaneously?
  - Can they understand and trust the system?
  - Can they travel with dignity and confidence?

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Audience reflection

- When thinking about inclusive mobility, what problems do you associate with everyday travel?

- Think about:
  - Walking / cycling
  - Public transport
  - Train stations & transfers
  - Car use / adapted transport

- Go to **wooclap.com** – code: **MOCAMJ**

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What we often think of first

- Common first associations
  - Steps, ramps, lifts and platforms
  - Width of footpaths and doorways
  - Wheelchair spaces
  - Accessible parking
  - Physical access to vehicles and stops

- But **lived experiences** reveal more:
  - Uncertainty
  - Stress
  - Dependence
  - Inaccessible information
  - Booking burden
  - Loss of spontaneity
  - Lack of dignity

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Who are persons with disabilities?

- **Multidimensional construct** consists of
  - Mobility-related impairments
  - Visual impairments
  - Hearing impairments
  - Cognitive or learning disabilities
  - Autism spectrum disorder
  - Intellectual disabilities
  - Mental health-related limitations

  - But also temporary or situational limitations:
    e.g. elderly persons, mothers with prams, persons with heavy baggage, tourists, persons after surgery…

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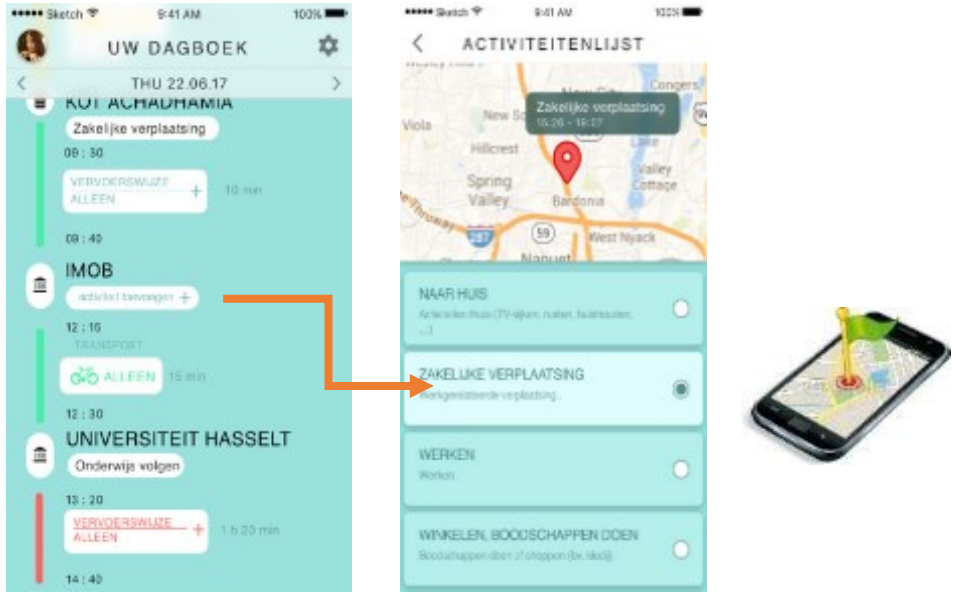
Measuring travel behaviour

- Traditional travel behaviour instruments often capture:
  - Trips that were actually made
  - Trip purpose, mode, distance and travel time
  - Routes, locations and sometimes mobility aids
  - Observable travel patterns

- Examples of traditional data instruments:
  - Paper-and-pen travel diaries
  - GPS tracking devices
  - Smartphone applications



Hoelaat vertrok u en met wie?	Wat ging u doen en om hoelaat?		Waar ging u naartoe?	Hoe bent u daar naartoe gegaan?		Gebruikte u een hulpmiddel en was de activiteit gepland?
.... uur .... min □ Alleen □ Gezinsleden □ Anderen	Ik kwam aan om .... uur .... min □ Naar huis □ Werken of zakelijk □ Onderwijs of studie □ Boodschappen/winkelen □ Sociaal (bv. iemand bezoeken) □ Verzorging (bv. revalidatie)	□ Vrije tijd (bv. sport, toneel) □ Wandelen, fietsen of rondrijden als ontspanning □ Iemand wegbrengen, halen □ Diensten (bv. bank, kapper) □ Andere, namelijk:	Straat: .... Postcode & gemeente:	□ Autobestuurder □ Autopassagier □ Bromfiets, motor □ Bus, tram of metro □ Gehandicapten-vervoer (Hendriks,...) □ Elektrische rolstoel □ Elektrische scooter	□ Te voet □ Fiets □ Belbus □ Trein □ Manuele rolstoel □ Andere, namelijk:	□ Activiteit gepland □ Activiteit niet gepland □ Kruk, wandelstok, rollator □ Manuele rolstoel □ Elektrische rolstoel □ Andere, namelijk: .....

Start time — Company — Activity type — Location — Travel mode — Mobility aid — Planning

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What traditional data may miss

- But where do we capture trips not made?

Start time

Hoelaat vertrok u en met wie?	Wat ging u doen en om hoelaat?		Waar ging u naartoe?	Hoe bent u daar naartoe gegaan?		Gebruikte u een hulpmiddel en was de activiteit gepland?
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Planning

Company | Activity type | Location | Travel mode | Mobility aid

- **Hidden mobility barriers** often appear as:
  - Trips that were not made
  - Activities that were cancelled
  - Destinations that were avoided
  - Routes that were considered too stressful
  - Spontaneous activities that were not possible
  - Dependence on others before a trip could happen
  - Extra planning, uncertainty and emotional effort

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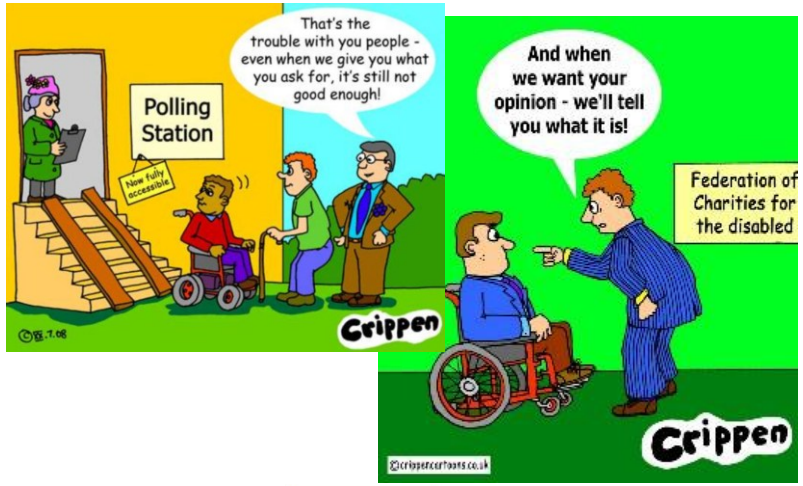
Nothing about us, without us

- Persons with disabilities (PWD) want to have an **active voice** in policies that affect their lives
- Experts by experience, revealing:
  - Barriers that remain invisible in technical audits
  - Differences between ‘can use’ and ‘can use independently’
  - Emotional and cognitive effort behind travelling
  - How people adapt their lives to mobility systems
  - Mismatches between policy assumptions and everyday reality



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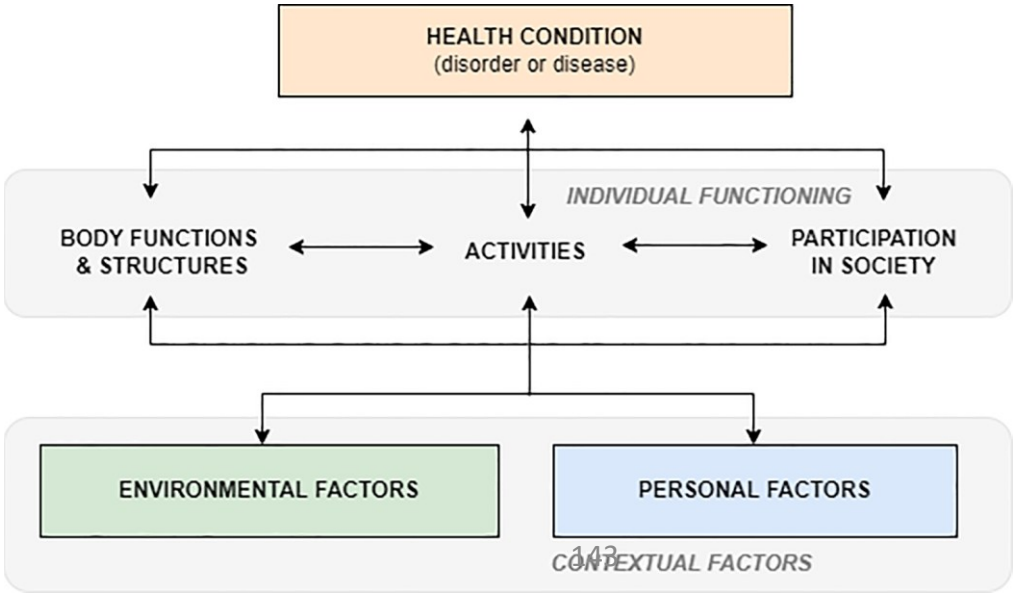
ICF-framework (WHO)

- International Classification of Functioning, Disability and Health
- **Participation/disability** as the interaction between
  - Features of the person (health condition)
  - Overall context in which the person lives (contextual factors)
    - Physical environment - Social environment
    - Organizational context - Attitudes & support systems



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Environment as barrier or facilitator

- The same impairment can lead to different mobility outcomes

- Conceptual examples:
  - A staircase can disable a wheelchair user
    ↔ a ramp can enable mobility
  - Missing audio information can disable a visually impaired traveller
    ↔ reliable announcements can enable independence
  - Complex disruption information can disable some users
    ↔ clear routines and support can reduce stress
  - A confusing station layout can create dependence
    ↔ simple wayfinding can support autonomy

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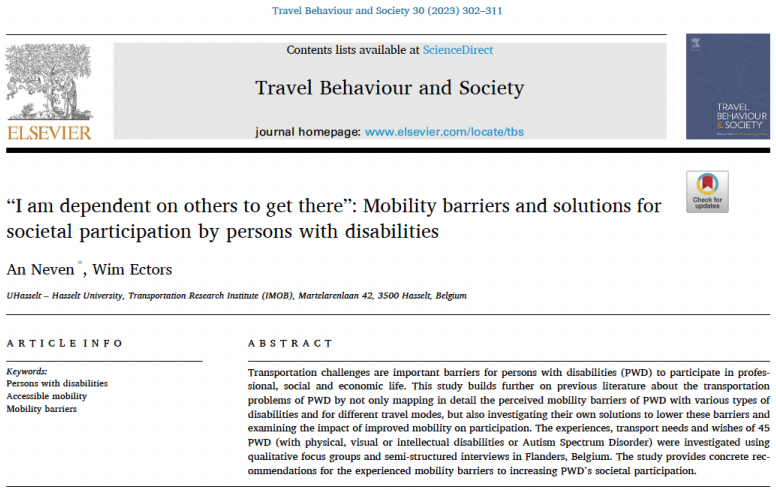
‘I am dependent on others to get there’

- Research focus
  - Everyday mobility barriers experienced by persons with disabilities
  - Trips across different travel modes
  - Role of the environment as barrier or facilitator
  - Coping strategies used by persons with disabilities
  - Impact of improved mobility on social participation
  - Recommendations for more inclusive mobility systems

https://doi.org/10.1016/j.tbs.2022.10.009



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“I am dependent on others to get there”: Mobility barriers and solutions for societal participation by persons with disabilities

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ARTICLE INFO

Keywords:
Persons with disabilities
Accessible mobility
Mobility barriers

ABSTRACT

Transportation challenges are important barriers for persons with disabilities (PWD) to participate in professional, social and economic life. This study builds further on previous literature about the transportation problems of PWD by not only mapping in detail the perceived mobility barriers of PWD with various types of disabilities and for different travel modes, but also investigating their own solutions to lower these barriers and examining the impact of improved mobility on participation. The experiences, transport needs and wishes of 45 PWD (with physical, visual or intellectual disabilities or Autism Spectrum Disorder) were investigated using qualitative focus groups and semi-structured interviews in Flanders, Belgium. The study provides concrete recommendations for the experienced mobility barriers to increasing PWD’s societal participation.

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Empirical basis

- Participants: PWD with different types of disabilities
  - **Unique perspectives and experiences**
  - Total of 45 PWD, 26 men and 19 women
  - Study conducted in Flanders, 2019
  - Recruitment: government agencies, leisure organisations for PWD, user organisations, etc. → distribute invitation to members
  - Cyclical approach: more data collection until data saturation

- Types of disabilities
  - Physical disability – wheelchair bound
  - Physical disability – walking limitations
  - Visual disability
  - Autism Spectrum Disorder (ASD)
  - Intellectual disability

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Qualitative research instruments

- Focus groups with persons with similar disability experiences
  - Small homogeneous groups, PWD with same type of disability
  - Elaborate on what persons think, why, underlying reasons
  - Duration of 2 hours (<-> intellectual disability: 1h30)

- Topic list covering:
  - Everyday mobility barriers
  - Different transport modes
  - Coping strategies
  - Participation impacts
  - Possible solutions

Current transport use and familiarity with modes
Familiarity with transport supply Current use of travel modes Accessibility and availability of facilities
Experience of mobility barriers
Differentiation by travel mode From different perspectives: ✓ Physical barriers (ability to move, physical accessibility, etc.) ✓ Emotional barriers (courage, fear, need for assistance, etc.) ✓ Intellectual barriers (understanding instructions, ability to ask questions, etc.) ✓ Organisational and financial barriers (need for booking, affordability, etc.)
Current solutions by PWD
Current (mobility) aids and solutions for making trips
Effects of removing mobility barriers
Impact on societal participation in daily life

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A methodological lesson

- Even participation in research can be inaccessible

- The research team paid attention to:
  - Accessible communication and information
  - Physical accessibility of the room and building
  - The possibility of bringing a companion
  - A positive and open atmosphere

but: almost half of the respondents couldn't get there!

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Qualitative research instruments II

- Individual semi-structured interviews
  - Alternative/pragmatic research approach: achieve intended number of PWD (7-10/type)
  - Same topic list & same points of attention
  - Conducted by telephone or face-to-face, duration of 15-50min per interview

- Analysis of FGD and interviews
  - Audio-recorded (permission) and transcribed verbatim
  - Thematic analysis: identify common themes (topics/ideas/opinions) & coded by a label describing their concent
  - Direct content analysis -> initial coding from main topics
  - No differences in themes found among FGD and interviews

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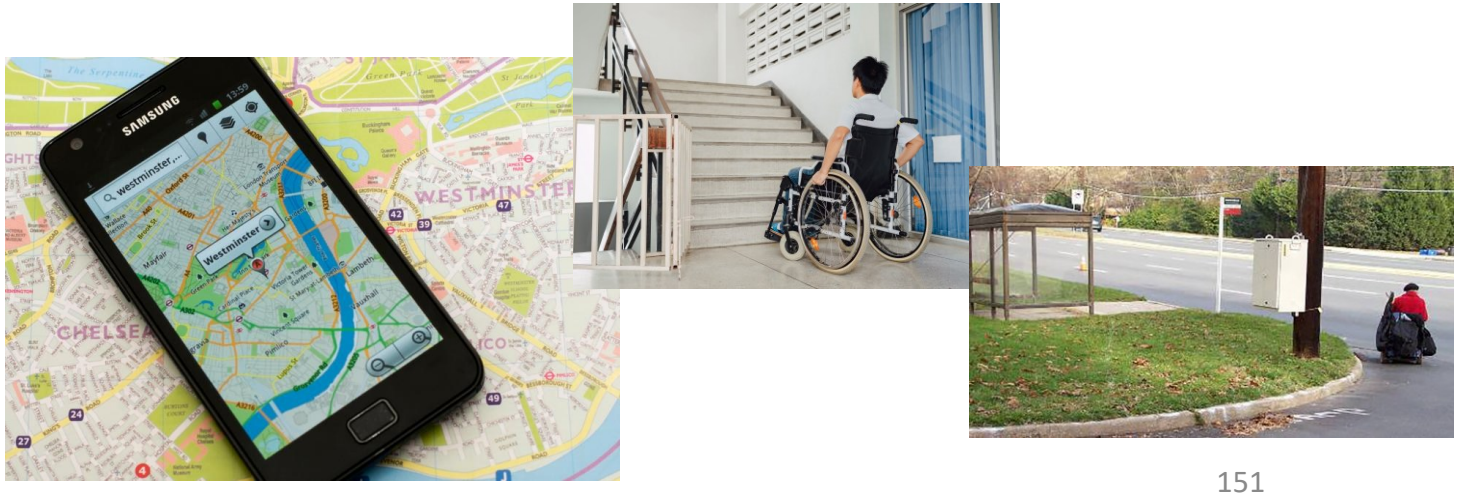
Everyday barriers across the transport chain

- Barriers accumulate across the journey
  - **Before the trip**: planning, booking, uncertainty, information
  - **To the stop or station**: public space, crossings, orientation, safety
  - **During the trip**: vehicle accessibility, communication, staff interaction
  - **Transfers**: time pressure, unfamiliar environments, stress
  - **At the destination**: building accessibility and support during the activity

Original study: barriers discussed for each individual transport mode



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Before the trip

- Planning and booking as barriers
  - Need to check accessibility in advance
  - Need to book assistance or adapted transport
  - Long booking periods reduce spontaneity
  - Repeated information requests create frustration
  - Planning becomes more complex when return trips are uncertain

- Examples from **lived experiences**:
  - Booking assistance 24 or 48 hours in advance
  - Needing to be at a stop well before departure
  - Booking more trips than needed and cancelling afterwards

”I make about 4–5 trips a week, and on Sundays, it takes me 20 min to book them all”.

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To the stop or station

- First and last mile matter
  - Footpaths, crossings and kerbs
  - Orientation and wayfinding
  - Safety in traffic interactions
  - Familiar versus unfamiliar routes
  - Daytime versus evening travel
  - Link between public transport accessibility and public space accessibility

- Examples from **lived experiences**:

"Challenging, as not everyone always realises that you are blind when crossing the road"

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During the trip

- Vehicles, information and communication
  - Vehicle accessibility and wheelchair spaces
  - Announcements and stop information
  - Driver or staff behaviour
  - Crowding, time pressure and stress
  - Uncertainty during delays or disruptions

- Examples from **lived experiences**:

”I don’t know where I am. I sometimes ask drivers if they can tell me when we are at my final stop, but drivers tend to forget”

”If there is no incident, I have no problems with the train or the bus. I find delays very annoying, especially with the lack of communication”

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Transfers

- Where barriers accumulate
  - More uncertainty
  - More time pressure
  - More need for orientation
  - Higher risk of missed connections
  - More reliance on assistance or staff
  - More stress if information is incomplete

- Examples from **lived experiences**:

"*And the train was gone! They had to jump and pull me in; otherwise, I wouldn't have been sitting here*."

"*That's often jumping*".

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At the destination

- Participation does not stop at transport
  - Is the building accessible?
  - Is support needed during the activity?
  - Is information understandable?
  - Can the person participate once they arrive?
  - Is the return trip feasible?

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The hidden mobility burden

- Invisible work of travelling
  - Preparing routes in advance
  - Checking accessibility and information
  - Planning extra transfer time
  - Preparing backup options
  - Managing anxiety and uncertainty
  - Arranging assistance or accompaniment
  - Avoiding unfamiliar places or times

- Examples from **lived experiences**:
  - Checking routes beforehand using Google Maps or Street View
  - Preparing different options in case something goes wrong
  - Planning additional transfer time to avoid stress
  - Learning to recognise bus numbers
  - Keeping emergency contacts ready
  - Travelling with someone who can help

”PWD are obliged to live a programmed life”.

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Predictability & information

- Predictability as a condition for independent mobility
  - Inconsistent or missing information increases stress
  - Route changes, delays and disruptions have unequal impacts
  - Real-time information must be accessible, understandable and reliable
  - Especially important for users who rely on preparation and routine

- Unexpected events are not equally disruptive for everyone
  - A delay may mean missing booked assistance
  - A changed platform may mean losing orientation
  - A cancelled late bus may mean losing freedom
  - A missing announcement may mean missing a stop
  - A staff misunderstanding may create stress or embarrassment

- Examples from **lived experiences**:

"I am sometimes quite afraid to speak to people if something is not going as I had prepared, or to ask something to the bus driver or conductor."

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Accessibility & safety

- Inclusive mobility requires inclusive safety
  - Fear of falling or getting hurt can limit travel
  - Unclear crossings and traffic interactions affect confidence
  - Stress during transfers can reduce independence
  - Perceived safety influences whether people travel, when they travel and where they travel

- Safety beyond crash statistics / what safety data misses:
  - Trips that are avoided because they feel unsafe
  - Routes that are not chosen because they are too stressful
  - Transfers that are avoided because they are unpredictable
  - Social interactions that create anxiety or embarrassment
  - Near misses, fear and loss of confidence

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Dependence versus autonomy

- Mobility is closely linked to dignity and independence:
  - Assistance can make travel possible
  - But dependence on assistance can reduce autonomy and spontaneity
  - Booking systems can force people to plan their lives in advance
  - Reliance on family, staff or fellow travellers can affect dignity and confidence

- Examples from **lived experiences**:

"You are dependent on the car to go to the physiotherapist, to the swimming pool, etc.; but you do not always want to ask your parents if they can take you".

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Social barriers

- Mobility also involves social interaction:
  - Asking for help can feel difficult or uncomfortable
  - Staff may not understand invisible disabilities
  - Fellow travellers may not recognise someone's needs
  - Communication problems can increase stress
  - Lack of awareness can become a mobility barrier

- Examples from **lived experiences**:

"I see asking for help as a sign of weakness, but I often ask fellow passengers just to be sure. On the outside, I am similar to the rest, but inside, I am busy"

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Types of barriers across travel modes

- The study identified barriers from different perspectives:
  - **Physical barriers**
    accessibility of public space, vehicles, stops, stations, parking
  - **Emotional barriers**
    fear, anxiety, confidence, need to ask for help
  - **Intellectual / information barriers**
    orientation, remembering routes, understanding information, communication
  - **Organisational / financial barriers**
    booking procedures, transport supply, costs, waiting times
  - **Other / social barriers**
    staff behaviour, awareness, social networks, lack of assistance

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Different users, different mobility burdens

Disability type	Main experienced barriers
Physical disability	Inaccessible public domain, PT vehicles, stops/stations - lack of awareness - limited social networks - financial barriers - insufficient supply - booking period and procedure
Visual disability	Safety issues - lack of experience - lack of respect - inaccessible information and orientation - inaccessible PT vehicles - limited social networks - insufficient supply - booking period and procedure
Autism spectrum disorder	Social barriers - safety issues - lack of accessible information and communication - booking procedure - communication with PT staff
Intellectual disability	Safety issues - lack of accessible information and communication

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Current coping strategies

- How users adapt to inaccessible systems:
  - Planning trips around more accessible trains or vehicles
  - Looking for helpful fellow passengers
  - Following the crowd to find the station entrance
  - Booking more trips than needed and cancelling afterwards
  - Contacting small taxi companies or familiar drivers directly
  - Teaching themselves to ask for help

- Examples from **lived experiences**:

"To follow the flock" to the entrance hall "and once I am there: it's OK"

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Preparation as mobility work

- Independent travel required extensive preparation:
  - Route reconnaissance via Google Maps or Street View
  - Preparing alternative options for unexpected events
  - Planning additional transfer time to avoid stress
  - Training the route beforehand
  - Learning to recognise the bus number
  - Keeping emergency contacts ready

- Examples from **lived experiences**:

“Preparation is the key to success for my independence”

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Technology as support, not a solution

- Digital tools can help, but not for everyone:
  - GPS-based apps can support independent travel
  - Smartphone tools can help with route preparation and real-time information
  - Simple mobile phones or pre-programmed contacts may be more appropriate for some users
  - Digital solutions can create new barriers for users with low digital literacy
  - Technology should complement, not replace, accessible environments and human support

- Examples from **lived experiences**:

“GPS takes me everywhere I want to go”

“I once fell asleep at the bus stop and called afterwards to ask what I should do”

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Effects of removing barriers

- Improved mobility can support:
  - More spontaneous activities
  - More independent travel
  - Access to non-compulsory activities
  - Reduced dependence on others
  - Greater participation in social life

- But impact depends on:
  - Location and time of activities
  - Type and severity of disability
  - Personal preferences
  - Accessibility of destinations
  - Support needed during the activity itself

- Examples from **lived experiences**:

"A lot has to happen before I will start using PT"

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Towards more inclusive mobility systems

- From isolated measures to inclusive mobility systems:
  - Improve accessibility across the full transport chain
  - Provide clear, reliable and accessible information before, during and after the trip
  - Reduce booking burdens and organisational barriers
  - Strengthen staff training and awareness
  - Create systematic channels for user feedback
  - Prioritise routes and destinations that matter for social participation

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Recommendations

- **Make participation systematic**
  - Open and frequent dialogue between users and transport providers
  - Involve persons with disabilities early in planning and evaluation
  - Create accessible channels for suggestions, complaints and feedback
  - Treat lived experience as expertise
  - Move from one-off consultation to continuous involvement

- **Improve the full transport chain**
  - Accessible stops, stations, vehicles and public space
  - Priority routes to key social destinations
  - Reliable accessible rolling stock
  - Attention to first- and last-mile accessibility
  - Accessibility beyond transport: destinations and activities

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Recommendations II

- **Make information accessible and reliable**
  - Clear information before, during and after the trip
  - Real-time information in accessible formats
  - Simple wayfinding and consistent signage
  - Pictograms or supportive technologies where useful
  - Communication that also works during disruptions

- **Reduce the burden on users**
  - Shorter and simpler booking procedures
  - Better integration of assistance and trip planning
  - Affordable adapted transport
  - Public transport buddies or travel training
  - Staff training and awareness
  - Courtesy campaigns for fellow travellers

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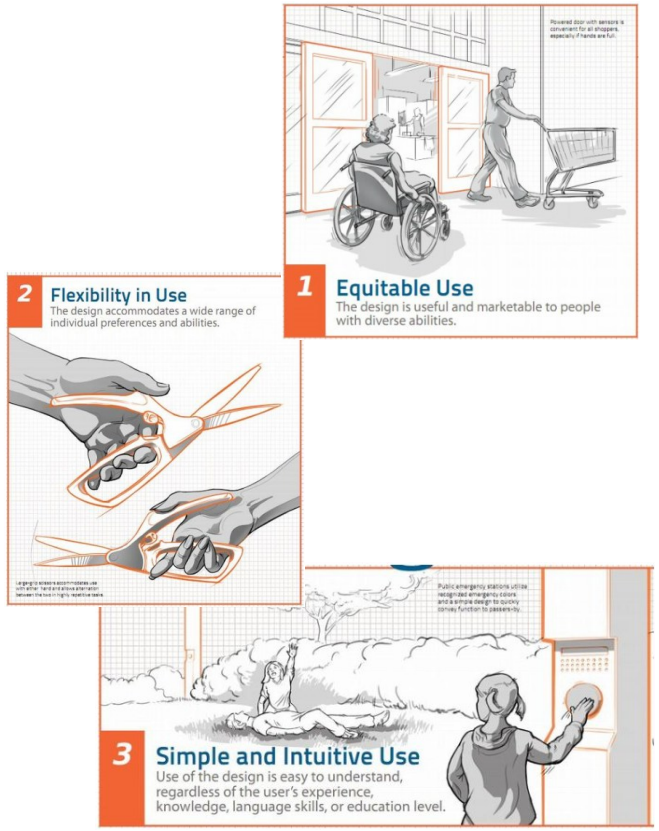
Rethinking mobility systems

- From:
  - Compliance with minimum standards
  - Isolated accessibility measures
  - Users adapting to systems
  - Assistance as an exception
  - Accessibility as a niche issue

- Towards:
  - Inclusive design for human diversity
  - Seamless transport chains
  - Predictable and understandable information
  - Autonomy and spontaneity
  - Participation as the outcome measure

Universal Design principle
Design usable by all people, to the greatest extent possible, without the need for adaptation or specialised design.



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Final takeaway

- Inclusive mobility is about more than reaching destinations
  - Autonomy
  - Dignity
  - Confidence
  - Predictability
  - Perceived safety
  - Spontaneity
  - Participation
  - Social inclusion

- Inclusive mobility requires us to move beyond technical accessibility and **rethink mobility systems from the lived experiences of the people who use them, and of those who are currently excluded from using them**

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INSIGHT 2026

Walking the City Through an Equity Lens: Field Observations for Group Work

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City walk

Image created by: Microsoft Copilot (2025). Created at the user's request on 24 February 2025.

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During the city walk…

Each group should analyse a location or short route using these four blocks:

- Mobility situation and equity
- Traffic safety and perceived safety
- Differences between user groups
- Accessibility/hidden barriers.

Document observations with photos and identify one or two critical moments where the mobility chain becomes difficult, unsafe, unclear or exclusionary for specific users. The final presentation should connect these observations to the lectures and propose one or two priority improvements to make the location safer, fairer, and more inclusive.

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Observe how well the location or route supports access to everyday opportunities.

1. Mobility situation and transport equity

- Multi-modal access: Is the location connected to public transport, cycling networks and pedestrian routes?
- Network density and continuity: Are walking, cycling and street networks sufficiently connected?
- Intermodal transfers: Is it easy to switch between modes, for example from bus to walking, cycling or shared mobility?
- Wayfinding and signage: Is navigation intuitive, with clear signs, maps or digital travel information?
- Public transport proximity: Are stops or stations within reasonable walking distance?
- Public transport service quality: Are services frequent, reliable and usable for different groups?

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Additional equity questions:

- Who can easily reach this location, and who may struggle?
- Does the location support access to work, education, care, leisure or social life?
- Are some users dependent on one specific mode because alternatives are weak?
- Would this place work equally well for people without local knowledge?

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Observe both visible traffic risks and situations that may feel unsafe, even if they may not be captured in accident statistics

2. Traffic safety and perceived safety

- Crosswalk safety: Are pedestrian crossings clearly marked, well-lit and supported by traffic signals or pedestrian islands?
- Cycling infrastructure: Are cycling lanes safe, continuous and separated from traffic where needed?
- Sidewalk conditions: Are sidewalks wide, obstacle-free and well maintained?
- Intersection safety: Are intersections designed to reduce conflicts and crash risks?
- Traffic flow and congestion: Does traffic flow create pressure, confusion or risky interactions?
- Speed control: Are speeds appropriate for a place with pedestrians and cyclists?
- Signage and visibility: Are road signs, markings and lighting clear and visible?

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Additional safety/equity questions:

- Which road users are most exposed to risk here?
- Are cyclists, pedestrians, children or older adults expected to negotiate complex traffic situations?
- Are there risks that may not appear in police-reported accident data, such as falls, near misses or avoided routes?
- Would this location feel safe at night, in bad weather or under time pressure?

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Observe how the same place may work differently for different groups

3. Differences between user groups

- Street-level experience: Is the walking and cycling environment comfortable, pleasant and engaging?
- Lighting and visibility: Is the environment legible and safe-feeling for different users and at different times?
- Resting points and facilities: Are there benches, resting areas and accessible toilets?
- Parking and drop-off: Are parking, drop-off and loading zones organised without blocking other users?
- Shared mobility and micromobility: Are bicycle parking, e-scooter hubs or shared mobility services well placed, without creating obstacles?

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Additional user-group questions:

- How might this place be experienced differently by women, children, older adults, people with disabilities, low-income users or unfamiliar visitors?
- Are there social norms or implicit expectations about who “belongs” in this space?
- Are some users expected to move faster, react quicker or take more responsibility than others?
- Are there places where people might avoid walking, cycling or waiting because of discomfort or perceived insecurity?

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Observe not only whether the place is technically accessible, but whether it enables independent, spontaneous and dignified mobility.

4. Accessibility, hidden barriers and lived experiences

- Barrier-free design: Are there ramps, lowered kerbs and wide pathways for wheelchair users, people with strollers or people using mobility aids?
- Tactile and auditory guidance: Are there tactile paving, audible signals and clear information for visually impaired users?
- Accessible public transport stops: Are stops well maintained, safe and accessible, with seating, shelter and understandable information?
- Pedestrian-friendly design: Are sidewalks continuous, obstacle-free and wide enough for different users?
- Interaction with public transport: Are stops designed to avoid conflicts between buses, cyclists and pedestrians?
- Accessibility for vulnerable groups: Are crossings equipped with tactile paving, auditory signals and ramps?

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Additional hidden-barrier questions:

- Would someone need to ask for help to complete this journey?
- Could the route be used spontaneously, or would it require planning in advance?
- What happens if there is a disruption, detour or unclear information?
- Are there points where someone might turn back, avoid the trip or depend on someone else?
- Does the environment support autonomy and dignity, or mainly technical access?

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